PAPERS OF THE
ROBERT S. PEABODY FOUNDATION
FOR ARCHAEOLOGY

VOLUME ONE · NUMBER THREE

EXCAVATIONS IN NORTHEASTERN MASSACHUSETTS

BY

RIPLEY P. BULLEN

PHILLIPS ACADEMY · ANDOVER, MASSACHUSETTS
PUBLISHED BY THE FOUNDATION
1949

PAPERS OF THE
ROBERT S. PEABODY FOUNDATION
FOR ARCHAEOLOGY

VOLUME ONE • NUMBER THREE

PAPERS OF THE
ROBERT S. PEABODY FOUNDATION
FOR ARCHAEOLOGY

VOLUME ONE · NUMBER THREE

EXCAVATIONS IN NORTHEASTERN MASSACHUSETTS

BY

RIPLEY P. BULLEN

PHILLIPS ACADEMY · ANDOVER, MASSACHUSETTS
PUBLISHED BY THE FOUNDATION
1949

PRINTED BY
GEORGE BANTA PUBLISHING COMPANY
MENASHA, WISCONSIN

PREFACE

THIS paper summarizes work done by the author over five years, 1942-1946 inclusive, while associated with the Robert S. Peabody Foundation for Archaeology, Andover, Massachusetts. Restrictions on travel, during the war, limited field work to sites within two or three miles of the Museum. Excavation of sites within that radius produced suggestions of stratigraphy and presented problems in culture history and geological interpretation.

With the improvement in the gasoline situation in 1945, it was possible to work farther afield. The Shawsheen River Valley and neighboring areas were surveyed to test hypotheses which had presented themselves, to gain an idea of the distribution of certain artifacts, and to secure data which might be of use if, at a later date, a geographical or geological investigation were made of the valley. The survey discovered some twenty-five previously unrecorded sites. While most of these appeared to be completely ruined archaeologically due to erosion, long cultivation, construction work, or removal of sand and gravel, some were extensively tested. In 1946, the work of the survey was extended to the coast near the mouth of the Ipswich River, about twenty miles to the east of Andover. That portion of Ipswich, Massachusetts, known as Great Neck, was intensively surveyed and excavation conducted at the Clark's Pond shell heap.

Previous excavations as well as the survey are discussed here. Data from the Hofmann site has been reworked in the light of more recent knowledge. Published reports on the sites at Foster's Cove, Camp Maud Eaton, and opposite the Stickney place have been rewritten and slightly reinterpreted. Anyone interested in a more detailed account of these four sites is referred to the original publications. The balance of the information is presented here for the first time.

In certain respects this paper should be considered preliminary. The number of specimens at excavated sites leaves something to be desired. Also the number of sites at which suggestions of stratigraphy occur is small and geographically restricted. That these sites check each other closely is gratifying. None of the excavated sites was completely dug. Portions have been left for subsequent investigators. The problem of sampling is always present.

No claim is made for completeness of survey or of testing of sites in the Shawsheen River drainage. Undoubtedly, significant data could be secured by further work at excavated, tested, or merely surveyed sites.

The interpretations and conclusions presented here are entirely those of the author. Time alone will tell whether or not they are justifiable.

ACKNOWLEDGMENTS

THE work covered by this paper has been done primarily with the assistance of various boys, including students at Phillips Academy, the author's sons, and some of their friends. These boys were paid by the Robert S. Peabody Foundation. Mr. Arthur M. Hofmann of Ballardvale, Massachusetts, and the author's wife, Adelaide Kendall Bullen, helped excavate the Stickney site; both they and Mr. Howard Torrey of Reading, Massachusetts, also helped at Foster's Cove. Special mention should be made of Edward Henry Cass of Gater Mills, Ohio, at that time a student at Phillips Academy, who helped excavate the sites at Foster's Cove and Camp Maud Eaton and spent two weeks of his summer vacation working on the survey, all as a volunteer. Scott Ilsley Paradise, of Andover, was also a student at Phillips Academy when he volunteered to work during the excavation of the Pringle site. The cheerful assistance of all is appreciated.

The author is indebted to the Robert S. Peabody Foundation for Archaeology for making the work and this publication possible. He is also indebted to Douglas S. Byers and Frederick Johnson of the Foundation for editorial assistance, helpful suggestions, and constructive criticisms.

Appreciation is due the many landowners who permitted excavations and tests on their land as well as the many unknown owners, upon whose land the author brazenly trespassed looking for sites. Everyone approached during this work, with one exception, was most gracious. Special appreciation goes to Mr. Francis Homer Foster of Andover who gave the author "carte blanche" upon his extensive holdings in Andover along the Shawsheen River and Pomp's Pond, which include at least four sites. Without the data secured from the sites at Foster's Cove and Camp Maud Eaton, this paper would never have been started. Great appreciation is also extended to Mr. Alexander B. C. Mulholland, of Ipswich, who, on behalf of the Proprietors of Great Neck, Inc., permitted unlimited excavation. His only stipulation was that the results be published.

The author is indebted to Barbara Lawrence of the Museum of Comparative Zoölogy, Cambridge, Massachusetts, for identification of animal bones. He is also indebted to three members of the staff of the Department of Geology and Geography, Harvard University, Cambridge, Massachusetts; to Dr. Marland P. Billings, for identification of lithic materials; to Dr. Kirk Bryan, for visiting various sites in Andover, and to Dr. Bryan and Dr. Kirtley F. Mather, for pleasant discussions regarding geological problems.

Special mention must be made of the author's appreciation of the cooperation

rendered by Mr. Arthur M. Hofmann of Ballardvale, Massachusetts. Not only did Mr. Hofmann help with some of the excavating and give freely of his time and knowledge gained in collecting Indian artifacts in Andover over a period of forty years, but he also made available to the author data on his own work at the Hofmann, Clemons, Ice House, and Camp Manning sites.

CONTENTS

LIST OF FIGURES

LIST OF PLATES

PART ONE

A SURVEY OF THE SHAWSHEEN RIVER VALLEY

INTRODUCTION

GEOGRAPHICAL SETTING

THE Shawsheen River is formed from the flow of many brooks draining swamps in an area of low relief in extreme northeastern Middlesex County and the southwestern portion of Essex County, Massachusetts. Its course lies in a north-northeasterly direction to join the Merrimack River which empties into the Atlantic Ocean (Fig. 1). A divide of land separating westerly-flowing brooks from the headwaters of Fish Brook, Boston Brook, and the Skug River—all tributaries of the Ipswich River—lies about a mile and a half to the east of the lower (northern) portion of the Shawsheen, mostly in the town of Andover. The Atlantic Ocean is only about twenty miles to the east. This divide of land consists of "hard rock" hills of hornblende diorite, granite, and gneiss covered with glacial till which forms the basis for the heavy clay soil found in these hills. Many drumlins add to the rolling character of the landscape in this portion of the state.

The Concord River, also a tributary of the Merrimack, lies approximately five miles west of Haggett's Pond, and four miles west of the confluence of Content Brook and the Shawsheen River.

A complicated kame and esker system runs in a south southeasterly line, crossing the Merrimack River about one and one-half miles west of the mouth of the Shawsheen and extending to the southwest of Martin's Pond.[1] This system has been cut by the Shawsheen River from about the location of Site 29 to that of Site 107 (Fig. 1).

Pomp's Pond (Fig. 1) probably represents part of a large ice block hole. Kames and kettle holes abound near its northern shore (Fig. 6). An ice contact slope extends from the southeasterly side of this pond southwesterly to the dam just north of Site 30 (Fig. 1). From the top of this slope a fairly high, pitted sand plain extends almost to the outlet of Foster's Pond. The northeasterly parts of this ice contact slope and sand plain are shown in Figure 6.

The upper reaches of the Shawsheen flow through a pitted sand plain that has been eroded by the river and its contributaries. To the south of Martin's Pond, in the watershed of the Ipswich River, are innumerable small hills surrounded by swamp lands. In this area, drained by Martin's and Lubber brooks and extending as far east as Site 97, there is as much wet as dry land (Fig. 1). To the south of the Ipswich River are found large hills.

[1] Wright, 1880.

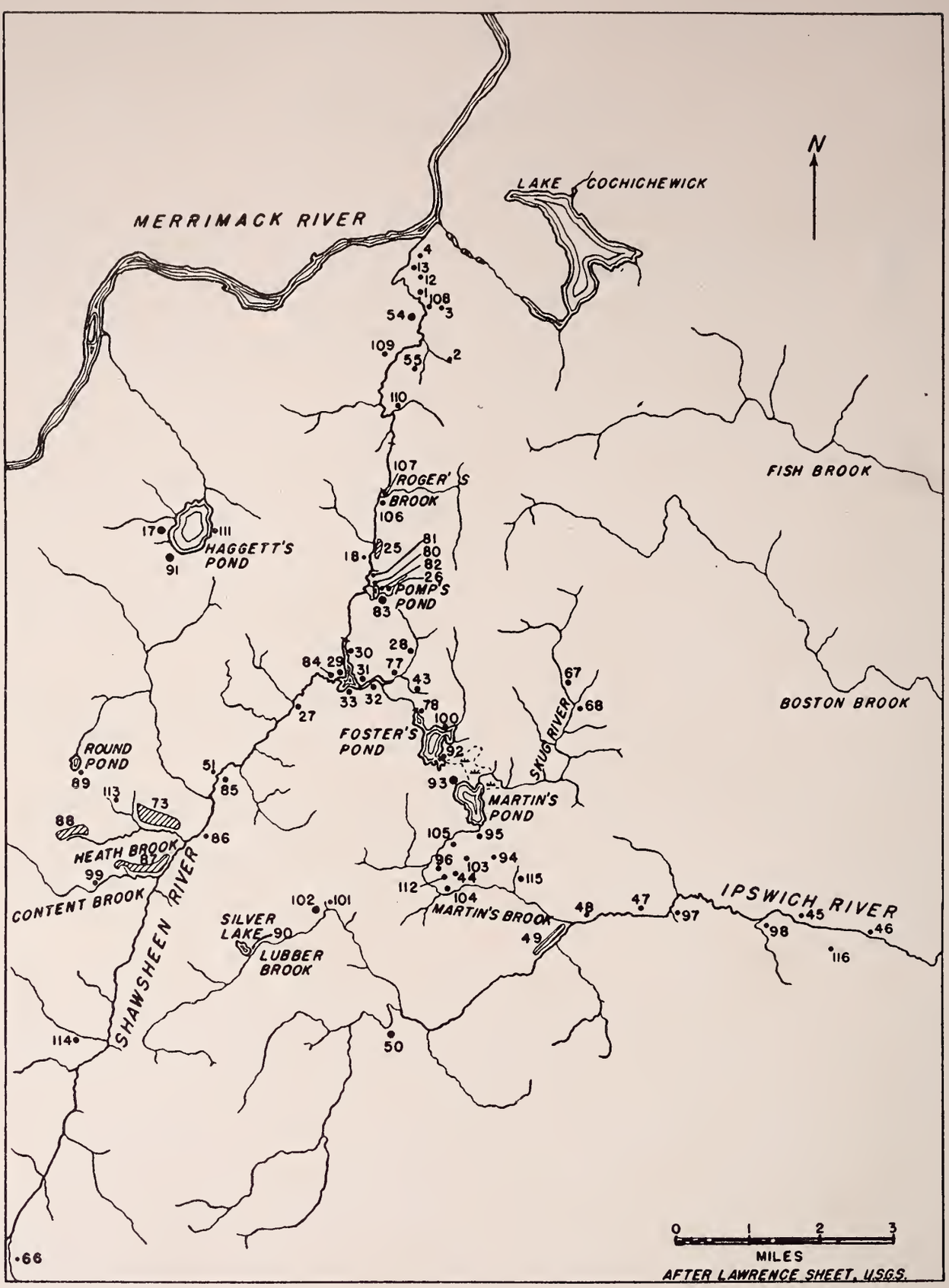

FIG. 1. Location of sites on the Shawsheen River and the upper portion of the Ipswich River drainage.

As a result of peri-glacial deposition, the Shawsheen River Valley has been the recipient of a tremendous quantity of sand and gravel. Old stabilized sand dunes, as well as active dunes and sand blows, are found. The lighter material is gradually working down hill and filling up the streams.

Near Site 66 (Fig. 1) the Shawsheen River is one hundred feet above mean sea level. The confluence of the Shawsheen and Merrimack Rivers is ten feet above mean sea level. The difference in elevation of about ninety feet is comprised in a river flow of about twenty miles. Forty feet of this drop, however, occurs during the cut through the kame and esker system. In general the river is shallow, sluggish, and bordered by swampy land.

The question may be raised as to whether the sluggishness of the Shawsheen is caused by dams. There are four dams on the Shawsheen, three of which are between Sites 110 and 30 (Fig. 1). The pond at Site 30 is formed by the dam farthest upstream. The effect of this dam does not extend as far upstream as Site 85 (Fig. 1) as there is a small stretch of rapids to the north of that site. The fourth dam, a very low one which backs up very little water, is near Site 13. There is also a dam at the outlet of Foster's Pond.

Mineral Resources

As has been mentioned, the bed rock in the area is diorite, granite, or gneiss; outcrops of these rocks occur in various places. At Site 67 (Fig. 1), beds of impure steatite are exposed. On both sides of the Merrimack River, to the west of the mouth of the Shawsheen, are metamorphosed slates and mica-schists interstratified with sandstone. Near Bartlett's Brook, on the north side of the Merrimack at the big bend (Fig. 1) is a "typical argillite slate."[2] In the many gravel banks and stream beds are pebbles and boulders of various rocks, including quartz. Felsitic rocks are conspicuously absent. Clay deposits suitable for pottery are found in kame and esker system.

Climate, Flora, and Fauna

The Shawsheen River Valley is in the zone of mixed forests transitional between the boreal conifers and the southern deciduous forests. It is approximately at the southern limit of canoe birch.[3] The climate is typically that of New England, with cold winters, hot summers, and sudden changes in temperature. Summers are close to the limit of 100 frost free days which mark the northern extent of commercial maize agriculture. The meliorating influence of the ocean is markedly less in the valley than at the seashore.

[2] Sears, 1905, p. 98. The author was unable to locate an outcrop of "argillite slate."
[3] Byers, 1946.

While the wind may, and does, blow from any direction, the worst storm winds, those accompanying blizzards in the winter or prolonged rains in the summer, come from the northeast.

The large amount of swamp land is a refuge for many food animals. Deer and small fur-bearing mammals must have been plentiful in Indian times. Muskrats are still trapped along the Shawsheen. Foxes are occasionally seen. All manner of native and migratory birds, particularly water fowl, used to be abundant. Not only did the streams and ponds supply freshwater fish, such as trout and bass, but the annual run of salmon, shad, and alewives was important to Indian economy. For vegetable food, the region offers roots, ferns, nuts and berries. If a famine should occur, fresh-water clams could keep body and soul together.

Travel and Trade Routes

Except for the Merrimack River to the north, there are no serious obstacles in the region for the foot traveller. Swamps may be avoided by following ridges. The Shawsheen River is shallow and readily forded.

For canoe travel the region presents various alternatives. The Merrimack River and its tributaries offer communication to the west and north. Two routes leading to the ocean are available. The easiest follows the Merrimack; but it is also possible in times of high water, to paddle by canoe from Foster's Pond through the swamp to Martin's Pond and so, via Martin's Brook, down the Ipswich River to the shore (Fig. 1).

Only a short distance separates the upper Ipswich River from the headwaters of the Mystic River, flowing into Boston Harbor. The mouth of the Charles River joins that of the Mystic while the mouth of the Neponset River is only five miles further south. The headwaters of these two rivers are close to the headwaters of streams flowing into Narragansett Bay on the southern shore of New England.

It is evident there is nothing peculiar to the Shawsheen River Valley which would isolate it from outside influences.

PREVIOUS WORK

Systematic archaeological work in the Shawsheen River Valley may be said to have started in 1939, when Hofmann began the excavation of the Hofmann site. From prior times the only available evidence is in the form of surface collections. It was not until the organization of the Massachusetts Archaeological Society, also in 1939, that collectors in general began to appreciate the importance of cataloguing their collections by sites.

Haggett's Pond, Camp Manning at Pomp's Pond, Pringle's, Lacy's, Pine

Ridge Cemetery, and some of the sites at the North Reading State Sanitarium are well known to collectors. Rarely are the collectors' names known to the owner or tenant of the land. A large amount of material from these sites has been scattered far and wide. Unfortunately it can not be reassembled for study.

The collection of Mr. Arthur M. Hofmann, of Ballardvale, Massachusetts, is catalogued by sites, but it is limited to the Andover part of the valley where most of the excavating has been done. The same may be said of the collections of the Robert S. Peabody Foundation. Mr. Winthrop S. Boutwell, of Andover, has a collection from Haggett's Pond and the Merrimack River. The extensive collection of the late Roy L. Esty, of North Reading, Massachusetts, contains a lot of material from the area under study. Unfortunately only the more recent finds are catalogued by sites. There is a large and well catalogued collection at the Haverhill Historical Society in Haverhill, Massachusetts, but it contains only a few specimens from the Shawsheen River Valley. Dr. Ernest E. Tyzzer, of Wakefield, Massachusetts, has a large and excellently catalogued collection including many specimens from the Lacy site. Mrs. Lacy also has a collection, but much material has been taken by unknown collectors prior to the start of these collections about ten years ago. Mr. Howard A. Jones, of Greenwood, Massachusetts, has a collection from the Old Carter Farm, in Wilmington. Other collections are small and scattered.

The Lacy site is the only one for which it is possible to secure an approximately representative inventory from surface collections. While collectors have been extremely cooperative, the amount of information available regarding associations is very limited.

The late Warren King Moorehead, who conducted many expeditions for the Robert S. Peabody Foundation, appears to have done very little work around Andover. His survey of the Merrimack River valley did not include the Shawsheen River.[4] Locally his work seems to have been restricted to the investigation of various earthworks.[5]

These earthworks consist of a ditch with the dirt thrown out always on the downhill side, forming a low mound paralleling the ditch. These ditches are fairly extensive and tend to cut off low meadow land along the river. Moorehead called them "forts" and, while careful to make his report preliminary and to present various alternatives, finally concluded "they are supposedly of Indian origin."[6]

[4] Moorehead, 1931.
[5] Moorehead, 1912.
[6] *Ibid.*, p. 55.

A careful reading of Moorehead's paper indicates that there is serious doubt as to their Indian origin and that, except for part of "Fort Graham," where the ditch crosses the Hofmann site,[7] no Indian material was found in association with these earthworks. A trench dug by the author through the "Fort Graham" earthwork where it crosses the Hofmann site, revealed the normal site profile below the old sod line under the thrown-out dirt, inverted stratigraphy above, and no chips, pottery, or other Indian material in the upper portion of the thrown-out dirt or in the ditch. Further investigation of this and other earthworks led the author to the very definite conclusion that they are not Indian but Colonial in origin, being variously drainage ditches, boundary lines, and ha-ha's.[8]

In his investigation of "Fort Graham," where it crosses the Hofmann site, Moorehead found knives, drills, and arrow and spear points which he illustrated in his report.[9] Except for the fact that one of these is made of quartz, they do not differ from those found there later by Hofmann.[10]

METHODOLOGY

This paper presents the results of excavation, test, and survey of Indian sites in the Shawsheen River Valley and neighboring territory. The total area involved is triangular in shape, with sides approximately twelve miles long (Fig. 1). Sixty-seven sites have been found or reported in this area.

The Hofmann, Stickney, and Foster's Cove sites were excavated in that order. The survey started with tests at the Camp Maud Eaton site on Pomp's Pond and then worked up the Shawsheen River. Later, a site survey and test excavations were made at Haggett's Pond, on the lower Shawsheen, and on the upper drainage of the Ipswich River.

In the present study, the Hofmann and Foster's Cove sites will be discussed first. Others will be considered as members of convenient territorial units into which they have been grouped. This is a convenient way to handle the data but it follows neither the order in which the work was done nor the relative importance of sites. In the table of contents only the more important sites have been listed.

So that the reader may readily follow the argument, problems in chronology presented by the excavation of the Hofmann and Foster's Cove sites will be

[7] See Fig. 2, also Bullen and Hofmann, 1944*b*, Fig. 12, for the relationship between this trench and the Hofmann site.

[8] Bullen, 1942.

[9] Moorehead, 1912, Figs. 15 and 16.

[10] Bullen and Hofmann, 1944*b*, Pl. XVII; also Pl. II this publication.

stated before the results of those excavations are given. To develop the thesis, evidence found at other sites will be compared with data from Foster's Cove which will be used as a control or standard of comparison.

For the site survey, United States Geological Survey topographic maps, 7½ minute series, were used. These maps were examined for geographical settings somewhat similar to those found at Foster's Cove and the Hofmann sites, i.e. fairly level areas adjacent to, and about twenty feet above, water. About half the areas so designated proved to be sites, provided the ground was not too rocky or the level area the result of modern grading. The survey was not limited to such areas but included sloping fields bordering streams and other possible locations.

Both sides of streams were followed as closely as possible by automobile with frequent stops for reconnaissance by foot. Possible locations were examined for surface indications where erosion or cultivation permitted. Otherwise, test holes were dug. Sites reported to the Museum by collectors were investigated. Some of these could not be found.

In this way some twenty-five sites, previously unknown to the Museum, were located. Certain of these sites were well known to collectors but not to the author before the survey. All sites, both those investigated by the survey and those reported by collectors but not located by the survey, have been indicated on the map (Fig. 1).

ARCHAEOLOGICAL AND GEOLOGICAL PROBLEMS

Excavations at the Hofmann site produced stratigraphic evidence of a non-ceramic lower zone characterized by large corner-removed projectile points and a superior zone containing pottery and triangular arrow points. Except for two points of quartzite and one of gray slate found in the lower zone, chipped implements were made from felsite.

At Foster's Cove, three zones could be postulated. The lowest was non-ceramic and contained corner-removed points of felsite or gray slate, similar to but smaller than those from Hofmann. An intermediate zone, also non-ceramic, produced small triangular and small-stemmed points, predominately made of quartz. In the top zone were found pottery, medium and large triangular points, and a few side-notched points, all made of felsite.

At both sites pottery made with coarsely-crushed rock as tempering material and malleated with a cord- or textile-wrapped paddle seemed to lie deeper, and therefor to be older, than other types of pottery. In neither case could any projectile points be definitely associated with this particular type of pottery.

The following archaeological questions arose:

1. Could other sites be found at which there was a similar sequence in shapes of projectile points?

2. Could sites be found representing only one of the three postulated cultural manifestations?

3. What was the distribution of these types of projectile points in terms of number of sites or in terms of a group of sites having similar geographical attributes.

4. Could coarsely tempered paddle-finished pottery be found at other sites in a situation substantiating the belief that it might represent a relatively early ware locally?

5. Could any particular type of projectile point be associated with this early type of pottery?

At the Hofmann and Foster's Cove sites, artifacts were found at depths as great as 50 cm. These specimens were not in pits. Geologically, there was difficulty in accounting for the burial of these tools. The situation and character of the deposit ruled out floods or deposition by wind. It is hard to believe this accumulation to be entirely the result of the movement of soil by worms, animals, and the natural growth of a forest floor. The author believes some form of slope wash or leveling-off process was responsible, but such an explanation is only a theory. It was not obvious from the situation.

The following geological questions were formulated:

1. Are these and other sites located on remnants of old river terraces?

2. If so, is there any possibility of evolving a relative dating for sites by geological means?

3. Are all the sites at which there are suggestions of stratigraphy so situated that slope wash in some form or other might be considered the burying agency?

4. Are there groups of geographically similar sites?

The survey and test excavations were made to secure additional data bearing on these problems. The Shawsheen River Valley and neighboring areas were chosen as a unit with the idea of trying to learn all that was possible about a limited area. Such a limited area also had the advantage of forming what might represent a "culture area" with a fairly uniform environment.

TYPOLOGY OF CHIPPED TOOLS

Projectile points and knives are the only stone artifacts found in the Shawsheen River Valley in fairly sizable quantities. Other implements will be described or illustrated in discussions of the sites where they were found.

The number of projectile points found at a site or found in one zone of a site is small. The range of variation in these points makes determination of

modal "types" difficult. Consequently, it has seemed desirable to group certain "types" into larger divisions or classes. This arrangement permits easier and more readable handling of data. The groupings chosen include all points found in appreciable quantities.

Arbitrarily, a length of 65 mm. has been taken as the division between arrow points and spear points. This has been done purely for purposes of description and does not imply a functional division at that length.

Projectile Points

Large Triangular Points.

Trianguloid, Concave Base[11] (Pl. III, 3-5; Pl. VII, 6, 7), Trianguloid, Tri-Incurvate (Pl. III, 2), and Lanceolate, Concave Base, Large (Pl. III, 10; Pl. VII, 8) have been combined to form a group called "Large Triangular Points."[12]

The length of all points of this class lies between 25 and 65 mm. Practically all are made of a dark felsite which exhibits but little patination. This group is distinguished from the following group not only on the basis of size but also by shape. Points in this group tend to have straight sides and sharp basal corners.

Small Triangular Points.

Trianguloid, Bi-Excurvate, Concave Base (Pl. III, 13-15; Pl. XIII, 1-3) plus a few Lanceolate, Concave Base, Small (Pl. VI, 12) form the class designated as "Small Triangular Points."

These points are almost always under 25 mm. in length but extreme examples up to 30 mm. are found. Predominately they are made of quartz. Those made of felsite exhibit moderate patination. One of the characteristics of this group is a rounded basal corner.

Points with Narrow Side Notches.

Trianguloid, Oblique Side Notched (Pl. III, 9; Pl. VI, 6, 7), and Lanceolate, Side Notched (Pl. III, 7; Pl. VI, 5; Pl. IX, 2) are combined to form this group.

Points of the first type are small, 25-30 mm. in length, with equilateral blades and notches at an oblique angle. The base is straight to concave and as

[11] Designation given in classification of points, in Byers and Johnson, 1940.

[12] A total of only three large lanceolate points with concave bases were found, divided between two sites. They have been included here in preference to making a special class for them.

wide as the blade. Points of the second type are longer, about 50 mm. in length, and rather narrow. On the average, notches are not as obliquely chipped; on one specimen they are at right angles to the axis of the point. Bases tend to be straight and slightly narrower than blades. In both types the notches are about 5 mm. in width.

All points with narrow side notches are made of felsite which is dark and but little patinated.

Points with Wide Side Notches.

These points are represented by fragmentary specimens. All have side notches about 10 mm. wide at right angles to their long axes. No complete specimen was found but presumedly Trianguloid, Side Notched, and Lanceolate, Side Notched would be the proper types (Pl. III, 11; Pl. VI, 11; XIII, 4). Bases are slightly concave, about 20 cm. wide, and slightly narrower than blades.

Fragments which form this group are made of grayish felsite which exhibits moderate patination.

Small-stemmed Points.

Trianguloid, Stemmed, Sharp or Rounded Corners; Trianguloid, Bi-Excurvate, Stemmed; and Lanceolate, Stemmed make up this group of points (Pl. III, 16-18; Pl. VI, 13-16, 20; Pl. IX, 6, 8, 12, 13).

The stems of these points exhibit a considerable range of variation, from those with the barest suggestion of a basal constriction to those having a well-made stem. The width of the stem is usually greater than half the width of the blade. The length of these points is usually under 25 mm., but larger ones up to a maximum length of 45 mm. are found.

Predominately these points are made of quartz. Those made of felsite exhibit moderate patination.

Straight-stemmed Points.

Lanceolate and Elongate, Stemmed, Straight Base form this group of points (Pl. III, 12, 25). The straight-sided stemmed base of these points is only slightly narrower than the width of the blade. Usually these points are made of felsite. Those of this material have become heavily patinated.

Corner-removed Points.

Trianguloid, Corners Removed, Straight Base (Pl. II, 16, 18; Pl. III, 23, 24; Pl. IX, 15), Trianguloid, Corners Removed, Rounded Stem (Pl. II, 14, 19; Pl. III, 19, 22), Lanceolate, Corners Removed, Straight Base (Pl.

II, 17; Pl. III, 23), and Elongate, Corners Removed, Straight Base (Pl. IX, 16) make up this group.

While there is variation in the stems of these points, all are modified for hafting by removal of the corners. Width of the base of the stem is approximately one half that of the base of the blade, or less. In form, the larger implements—spears—are usually Lanceolate, Corners Removed, Straight Base while smaller implements—arrows—tend towards the Trianguloid, Corners Removed, Rounded Stem type.

Length of these points varies from 25 to 115 mm. Corner-removed points less than 35 mm. in length are very rare. Corner-removed points are usually made of felsite which has become heavily, sometimes, extremely, patinated. Some are made of gray slate which has also become heavily patinated. Two examples from the excavations and about the same number found in surface collections from the area are made of quartz.

Knives

Large Hafted Knives.

This group is comprised of large, wide, and relatively thin knives having isosceles triangular blades and stemmed bases modified for hafting (Pl. IV, 1, 2; Pl. VI, 21). They are slightly asymmetric.

Small Flake Knives.

In this class belong knives made from a flake, commonly concavo-convex, by secondary chipping along the edges, usually on both sides (Pl. IV, 3).

Asymmetric Trianguloid Knives.

Knives which resemble a large isosceles triangle in outline but are usually markedly asymmetric fall into a third category. They are frequently poorly or carelessly chipped. They vary from 40 to 90 mm. in length, are usually made of felsite, and exhibit moderate patination (Pl. II, 27; Pl. VI, 8; Pl. XIII, 15-21).

It is difficult to distinguish between a well made knife of this type and a large triangular arrow point. The associations weight the decision in such a borderline case.

Ovate Knives.

Little can be said to characterize these implements beyond designating them by the term "ovate knives." They vary greatly in size. Sometimes they have a straight base. Usually they are made of felsite which has become moderately patinated (Pl. XIII, No. 22).

Trapezoidal Knives.

These knives are retouched along both edges of only one surface which frequently shows, between the flake scars, a fault surface of the rock. The opposite surface is relatively flat. The implement has a trapezial cross section with one chipped edge steeper than the other. Knives of this group are usually made of felsite and are usually heavily patinated (Pl. IV, 6).

CLASSIFICATION OF POTTERY

Pottery may be classified according to the type of tempering material. When different kinds of surface decoration are compared with different types of tempering material and a high correlation between certain pairs is found, it seems proper to speak of pottery wares. Such a condition occurs among pottery found in the Shawsheen River Valley. Furthermore, implications of a chronology appear to derive from the situations in which wares so identified were found. They are described below, according to the apparent chronological sequence, starting with the earliest. The evidence for the sequence will be given later.

Coarse Mineral-Tempered Wares.

Angular fragments of crushed quartz form the usual tempering material for this class of pottery, but crushed granite is frequently used. In the latter case, inclusions of mica are sometimes found. The angular fragments vary greatly in size but are noticeably large. A great many are over 3 mm. in length and grains 5 mm. long are not rare. Temper represents about 20-30% of the paste.

In color, this ware varies from tan (Clay or Tawny-Olive)[13] to reddish-brown (Pecan Brown or Wood Brown). Surface hardness is between 3 and 4 on Mohs' scale. Walls are fairly thick, ranging from 7 to 12 mm. in this respect.

Due to the small size of sherds, little may be said about shapes of vessels. Some have slightly flaring mouths with only a suggestion of a neck (Pl. II, 11; Pl. VI, 1). With few exceptions, rims are simple, rounded, undecorated, and not as thick as the neck or body. One exceptional sherd has a completely convex side with a rim which is pinched inward and bears a cord or textile imprint like that on the side (Pl. II, No. 13).

The predominant decoration consists of impressions made by cord- or textile-wrapped paddles with which the surface was malleated. Frequently these impressions are found on both the outer and inner surfaces but sometimes

[13] All color references to Ridgway, 1912.

they are found only on the outer one. Imprints are commonly coarse, three strands occurring per centimeter, but sometimes fine enough for five per centimeter (Pl. II, 11-13; Pl. VI, 10). Undecorated sherds are occasionally found.

A distinct variant of this ware, found at Camp Maud Eaton, has an undecorated outer surface which has been especially prepared by wiping with a damp cloth or skin. This surface is very "sandy," shows fine striations, and has areas where additional material has adhered. The inner surface, if we may judge from that which is preserved on only one sherd, appears to have been hand smoothed. This variant has a lower surface hardness than other coarse mineral-tempered pottery, being only 2-3 on Mohs' scale (Pl. VI, 9).

Variations in decoration, represented only by individual sherds from Camp Maud Eaton, include faint, fine, squarish, dentate imprints; parallel rows of impressions, 1 × 3 mm. in size; craters "picked" out of the surface by a curved tool; and two "rocker"-marked sherds. One of the latter has a square rim with small indentations at both its outer and inner edges (Pl. VI, 4). At Camp Maud Eaton, sherds bearing these decorative variants were not found at depths as great as "wiped surface," cord- or textile-marked sherds. The square rim and rows of parallel imprints are suggestive of the later vegetable-tempered wares described below.

Vegetable-Tempered Wares.[14]

Edges of fractures of vegetable-tempered wares are found to include numerous plane surfaces and small rectangular slits. Similar plane surfaces are also found on the surface of the pottery as small craters with undercut edges. Many of these surfaces, when examined with an eight-power glass, show straight parallel striations. Sometimes striae can be seen with the unaided eye. All sherds examined with a twenty-four power microscope showed striations on such surfaces. These appear to be molds of the grass used as tempering material.[15] The largest mold noted is 5 × 24 mm. Usually they are small, about

[14] These wares have been called "fiber-tempered" by the author in previous publications (Bullen and Hofmann, 1944*b*, Bullen, 1946*a* and 1946*b*). In order to prevent any confusion with certain wares of southeastern United States, it seems best to use the term "vegetable-tempered" for the New England wares. "Grass-tempered" has been suggested but it may prove to be too narrow a term and it still permits possible confusion. No connection is known to exist between "vegetable-tempered" wares of New England and "fiber-tempered" wares of the Southeast.

[15] Samples were sent to Dr. Hugh M. Raup, at the Arnold Arboretum, Boston, Mass., who kindly identified them as molds of grass.

3 mm. across. Casts of fern leaflets as well as those of twigs have been found. Presumably these are accidental inclusions as grass seems to have been the intended tempering medium.

Pottery of this class does contain a small amount of mineral aplastic—grains of rounded quartz predominantly under .5 mm. in diameter. It is quite possible that this material was originally present in the clay. Very rarely, some fragments of crushed rock will be found. These mineral inclusions are extremely minor in importance in comparison with the large number of molds of vegetable matter. In one lot of 2000 sherds only 64 mineral inclusions over 5 mm. in diameter were noted.

Vegetable-tempered wares are brown (Sayal Brown) in color; the surface hardness is 2-3 on Mohs' scale. Vessel walls are of medium thickness, usually approximating 5 mm. with a range of from 4 to 8 mm. in this respect. Little is known about shapes of vessels. One basal portion indicates that such vessels had a pointed bottom. Rim sherds indicate that they had a slight neck and usually a little eversion of the lip. Characteristically, the rim is nearly twice as wide as the thickness of the neck (Pl. II, 6-8; Pl. V, 2). Frequently the top of the rim is flat, but it may be a little convex and higher near the outside than near the inside edge. In about half the samples, the top of the rim, if flat, is decorated with parallel marks like those found on the neck.

Decoration applied to vegetable-tempered pottery consists of minor variations on a central theme of "parallel rows of parallel marks." In the more common arrangement these marks are about 1 × 3 mm. in size and are made at an angle of about 20° from a perpendicular to the row. As these marks are shallower at the ends, curved in cross section, and exhibit individual imprints of twisted fibers, it is presumed they have been impressed by means of a cord-wound stick. The space between marks in a row suggests that either the cord was very thick or else that it was wound spirally about the stick with a space between the turns (Pl. II, 7, 8).

In other cases, the marks have been made by carved tools or fingernails. If one may judge from the marks, tools were straight-edged, curved-edged, pointed or double-pointed. Sometimes the tool was trailed between impressions. Occasionally, material has been "picked out" of the surface to form rows of marks.

These marks are found on the neck and shoulders (Pl. II, 6, 7). Frequently they are also found on the rim. Lower portions of vessels are undecorated. Interiors have been scraped with narrow, straight-edged tools, leaving "channeled" scraping marks. Sometimes these scraping marks, like those on the lower portion of the exteriors, have been rubbed out and obliterated.

In one unusual variant, found only at the Hofmann site, the outside surface

is furrowed in a criss-cross manner giving a pseudo-basketry effect. Widths of the furrows indicate that two different straight-edged tools were used (Pl. II, No. 10).

Fine Mineral-Tempered Wares.

These wares are the least common wares of the Shawsheen River Valley. In general, they are tempered with crushed granite which has been ground up fairly fine. Grains of temper are small, with a maximum diameter of .5 mm. Temper represents about 10-15% of the paste. A few grass molds have been found, but they are of minor importance. This ware is brown (Pecan Brown) in color, its hardness is 2-3 on Mohs' scale, and its thickness varies from 5 to 7 mm.

One rim sherd has a simple rounded rim, slightly thinner than the body. The side appears to be straight. Decoration consists of a band of diamonds and triangles made by the impressions of a cord-wound stick (Pl. V. 1). The marks of the cord are close together and are not separated, as is the case with vegetable-tempered wares.

A square rim occurs on another sherd. As the rim was flattened, the lip was turned down on the outside, but the portion which was turned down has not been completely smoothed. The flat top is incised with straight lines to form crude triangles. A third rim sherd has a rounded external lip which has been pressed outward beyond the side. No neck is evident. The side is incised with parallel marks between parallel straight lines to form a triangular or herringbone design (Pl. VII, 1).

Sherds from two vessels with Mohawk-like collars were found at Camp Maud Eaton. They are tempered with finely-crushed granite seldom exceeding 1 mm. in diameter. They are brown (Buffy Brown) in color, 3 to 6 mm. thick, and, in surface hardness they approach 4 on Mohs' scale. If one may judge from some sherds with concave outer surfaces, one of these vessels was decorated on the neck with a fine textile imprint. Sherds illustrated (Pl. VII, 2) indicate that one vessel had a noded collar with notches at the top and bottom. Between the rim and the base of the collar are three incised lines below which is a frieze formed by incised lines which alternate their direction to produce triangles.

Fragments of another collared vessel have been found by Dr. E. E. Tyzzer, of Wakefield, Massachusetts, in a limited locality at the Lacy site. It has a noded collar with basal notches but the space between the rim and the base of the collar is filled with incised horizontal lines between which are rows of short curved lines (Pl. X, 1). Neck and body are undecorated. This vessel is tempered with crushed quartz which is medium coarse and fairly abundant.

MAJOR EXCAVATIONS

HOFMANN SITE

THE Hofmann site[16] (Fig. 1, Site 43) is located on a sandy ridge extending from higher land to the northeast between a small brook on one side and a swamp on the other (Fig. 2). It is crossed by a Colonial ha-ha. East of the ha-ha is the large hole labeled "Colonial Excavation" on our plan (Fig. 2). In 1912, Moorehead, while investigating "Fort Graham" dug extensively around this hole and made one or two other test holes on the site. Except for this and for lumbering activities, the site had not been disturbed or plowed prior to excavation. The site was excavated during summers from 1939 to 1942, the first three seasons by Arthur M. Hofmann of Ballardvale, Massachusetts, and the fourth by Hofmann and Bullen.

As shown on the sketch map (Fig. 2) three locations with a total area of 4000 square feet were excavated. The space between the central and eastern excavated areas had been disturbed by the Colonial Excavation and Moorehead's investigation. Between the central area and that to the west is a slight natural declivity nearly devoid of Indian remains.

The soil profile at the site consisted of three zones: first, loam or dark brown humic-stained sand about 14 cm. thick, including the sod; second, a sandy layer of variable thickness, blending from red-brown to yellow-brown toward the lower part of the zone; third, sterile yellow or white sands and gravels. Near the middle of the site, the red-brown portion of the second zone was about 13 cm. thick, while the yellow-brown portion varied in thickness from 8 to 18 cm. Towards the east, these sands were thicker, presumably as the result of slope wash, while to the west they tapered out entirely, leaving a scant growth of grass directly on the gravel. In the latter case, chips and artifacts were found in the upper part of the gravel. Off the site these zones were similar but the color range in the second was from a brown, instead of a red-brown, to yellow-brown.

Across the brook to the east, evidence of occupation had been found in the form of chips. It did not appear profitable to excavate there.

Structural features at the Hofmann site consisted of a stone hearth, three stone pavements, five "three-stone" fireplaces, and eight pits located approximately as shown on the sketch map (Fig. 2).

The stone hearth (Pl. I, 1), containing only one round stone, was built of

[16] Bullen and Hofmann, 1944*b*.

angular fragments of granitic rock, 7.5 to 30 cm. in greatest dimension, placed close together with the flattest side up.[17] The larger rocks were nearer the perimeter. While overall dimensions were 238 cm. by 190 cm., the structure was divided into two saucer-shaped parts, each about 110 cm. in diameter, with concavities reaching a depth of 10-12.5 cm. at the center of each. The western "saucer" was higher, and probably built at a slightly later time. Both portions consisted of only one course of rocks. Tops of peripheral rocks were found in the loam. Beneath the hearth was a layer of charcoal which increased in thick-

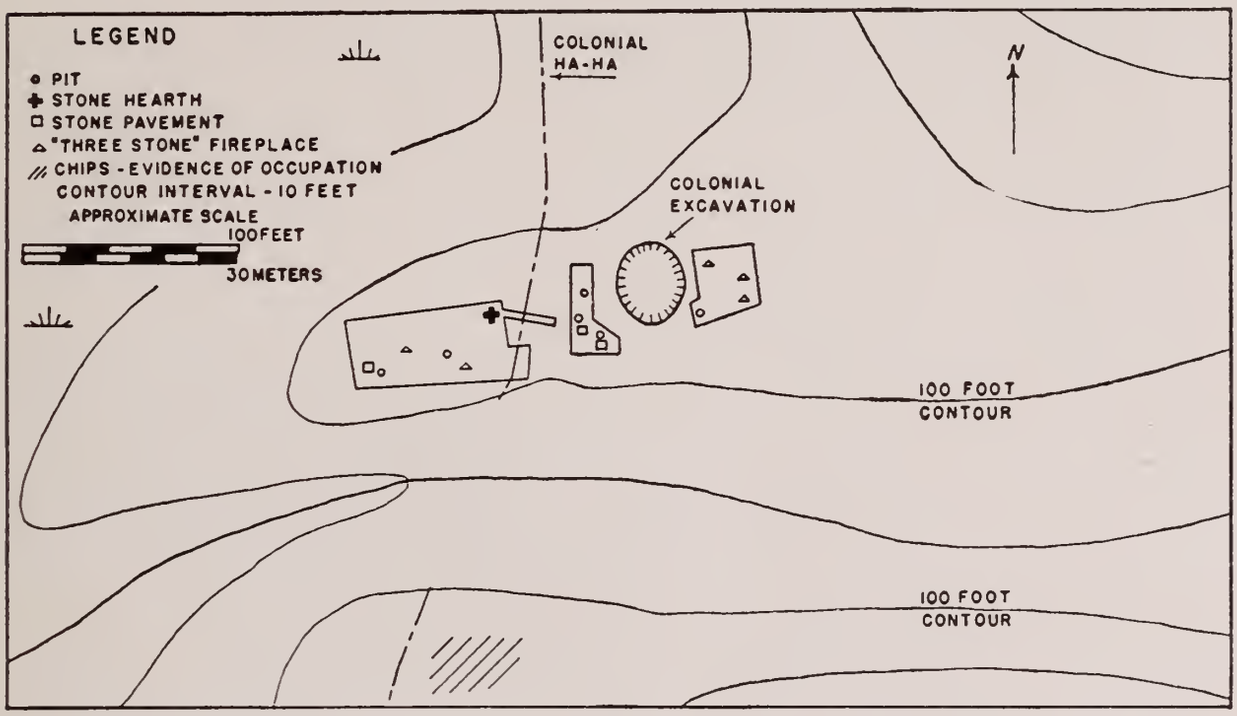

FIG. 2. Sketch map of the Hofmann site.

ness from 1 cm. at the edge to 5 cm. in the middle, below the junction of the two "saucers." Under the charcoal was sand, sterile except for one chip and a small pit. No other chips or artifacts were found in the ground near this hearth.

In the hearth was fine black powder, but no great quantity of charcoal. To the east, under the dirt thrown out from the ha-ha and in and under the old sod line, was a very large accumulation of charcoal and ash with calcined bone and some angular fragments of granitic rock. This may possibly have been a dump such as might have resulted from cleaning and reconstructing the hearth.

A pit, 40 cm. in diameter, with a vertical measurement of 38 cm., was found a short distance in from the southeastern edge of the hearth. It contained

[17] Hofmann, 1942.

a little charcoal, two angular fragments of rock, remnants of something which might have been birch bark, and sand. The sand was stratified in three layers, light brown, dark brown, and gray, from top to bottom.

The three stone pavements, found entirely in the red-brown sand, consisted of fairly level deposits of angular fragments of granitic rock, none with a diameter greater than 15 cm., packed closely together. Other angular fragments of rocks were also found scattered over the site but they were not packed into pavements. These pavements were not associated with post holes but a storage pit was always found nearby (Pl. I, 3). Pavements were partly one and partly two courses thick. Chips and artifacts were found in, under, and around them. One pavement measured 51 × 46 cm. (Pl. I, 2), the others occupied irregular areas 1 × 2 and 1 × 1.5 meters in extent, (Pl. I, 3). Near the edge of one, an area 38 cm. in diameter had been reddened by heat.

Each of the five "three-stone" fireplaces consisted of three stones, about 20 cm. long, enclosing an area in which there was a quantity of charcoal. On either side of one hearth was a post hole.

In diameter, pits varied from 15 to 90 cm. across the top; vertical dimension varied from 23 to 65 cm. The pit found under the stone hearth has been described. One pit contained a quartz core and chip. The top of this pit and that of one other were definitely found in the red-brown sand, lower than the base of the loam, but the others, with the possible exception of the one under the stone hearth, apparently were dug from a surface now within the loam. One of the latter pits contained 160 sherds of vegetable-tempered ware, decorated with pseudo-basketry impressions. These lay in black dirt containing a great deal of charcoal. A post hole 10 cm. in diameter and 30 cm. deep was found near each end of one elliptical pit, 90 cm. in greater axis, which was filled with charcoal. These post holes were 188 cm. apart.

Artifacts found at the Hofmann site are illustrated in Plate II and particulars regarding them are itemized below. Not included are a somewhat dubious snub-nosed scraper; two stone balls 20-40 mm. in diameter; seven rounded pebbles 28-70 mm. in diameter, of which one had been used as a hammerstone; a rock 110 mm. long, noteworthy because one side was polished, the adjoining edge ridged as if used as a sinew stone, and one end and one side were pecked; four utilized chips with retouched edges; a portion of a finely chipped black felsite drill of which the base was missing; and several anvil stones. The latter were found, apparently left as used, with slightly hammered surface up, chips and possible chipping hammers nearby.

Tabulation of the provenience of artifacts makes it evident that there were two zones at the Hofmann site; an upper one, in which pottery and triangular arrow points occurred, and a lower one, in which there were corner-removed

points for arrows and spears, but no pottery. There is also a suggestion that coarse, mineral-tempered wares were earlier than vegetable-tempered wares.

There was no overlap between these two zones but neither was any substantial sterile zone noticed between them. The pottery and few triangular

PROVENIENCE OF ARTIFACTS FROM THE HOFMANN SITE

Type	Plate II	Quantity	Vertical Distribution		
			Loam	Upper 8 cm. of RB sand	Balance of RB,YB sand
Medium and large triangular points	1, 3, 4	12	11	1	
Small triangular points	2	4	1	3	
Cupped stone	5	1	1		
Vegetable-tempered sherds	6-10	1000	XXXX	X	
Coarse mineral-tempered sherds	11-13	160	X	XX	
Soft graphite, scored	22	1		1	
Rollar pestle	25	1		1	
"Specialized" spear points, corner-removed type	16-17	8			8
Corner-removed spear points	15, 18	24			24
Other spear points	20	1			1
Corner-removed arrow points	14, 19	27			27
Basal fragments of corner-removed points, probably spear		14			14
Notched points	21	2			2
Drills	23	5			5
	24	1			1
Asymmetric trianguloid knives	27	3			3
Ovate knife	26	1			1
"Beach pebble" hammerstone	28	1			1

arrow points found in the upper 8 cm. of the red-brown sand were present in restricted areas. Otherwise corner-removed points were found irregularly distributed from near the top of the red-brown sand to the base of the yellow-brown sand, with a slight suggestion of concentration near the middle of the red-brown sand. Unfortunately no record of depths in the lower zone is available. In the lower zone, corner-removed points were associated with apparently significant quantities of expanded-base drills with indented sides (Pl. II, 23) and asymmetric trianguloid knives (Pl. II, 27).

The "specialized" spear points (Pl. II, 16-17) are only 7-8 mm. thick, but the balance of the spear points and the larger corner-removed arrow points are somewhat heavier. In the lower zone, points for spears outnumbered points for arrows. The large size and heavy weight of the majority of these points suggest that spears were used more frequently than bows and arrows. The similarity to atlatl points of the southeastern "Archaic" is extremely close. Nothing remotely resembling an atlatl weight was found.

With the exception of two points of quartzite and one of gray slate, all the chipped specimens are made of various felsites. The triangular points are all made of a dark felsite and exhibit little if any patination. The corner-removed points are all patinated to varying degrees, many heavily. The asymmetric triangulоid and ovate knives are moderately patinated.

When compared with similar artifacts from other sites, the inventory from the Hofmann site will be found to be striking because of the nearly complete lack of objects of quartz. One quartz core and a half dozen chips were all the specimens of this material that were found. A small triangular point of quartz from "Fort Graham,"[18] illustrated by Moorehead, may have come from this site. Other specimens illustrated by Moorehead are similar to those found by Hofmann and the author.

Slope wash or surface creep are presumed to be responsible for the accumulation of the sands in which artifacts at the Hofmann site were found. It seems necessary to invoke a gradual accumulation of material in order to explain the stratigraphy. Possibly the site was located on small kames and a leveling process buried the tools. Certainly there has been no substantial addition of material to the site by floods or wind action.

Apparently a few families lived at the Hofmann site over a long period of time. They themselves either brought or secured by trade the felsite they worked into tools. As was the fashion among inhabitants of neighboring sites, they built stone hearths, stone pavements, and dug pits. These stone features they made of Andover granite, readily available from a nearby ledge, rather than of waterworn cobbles such as were used elsewhere.

Deer bones[19] and one charred hickory nut are all that remain to give evidence of the nature of their food supply. Post holes at either side of the charcoal pit and one of the "three-stone" fireplaces suggest supports for something, possibly food or a food container, over a fire. The "three-stone" fireplaces may represent an alternative method, by which a vessel was supported by three rocks. The double hearth offers a third way of preparing food or it may have been

[18] Moorehead, 1912.
[19] Hofmann, 1940.

used for a sweat bath or some other purpose requiring heat. The stone pavements were made for some purpose, but just what that may have been is debatable. To call them house floors is to do so without any factual evidence other than the presence of the pavements themselves.

FOSTER'S COVE

Foster's Cove site[20] (Fig. 1, Site 81) is located on level land twenty feet above the eastern shore of the Shawsheen River (Fig. 6). The site is concentrated in the northeastern portion of this land beside a small brook.

To the southeast, between the site and Pomp's Pond, are numerous kames and kettle holes (Fig. 6). Across the brook to the north is a plowed field about ten feet lower than the site. No indications of aboriginal occupation could be found in this field. However, to the northeast of the site, also across the

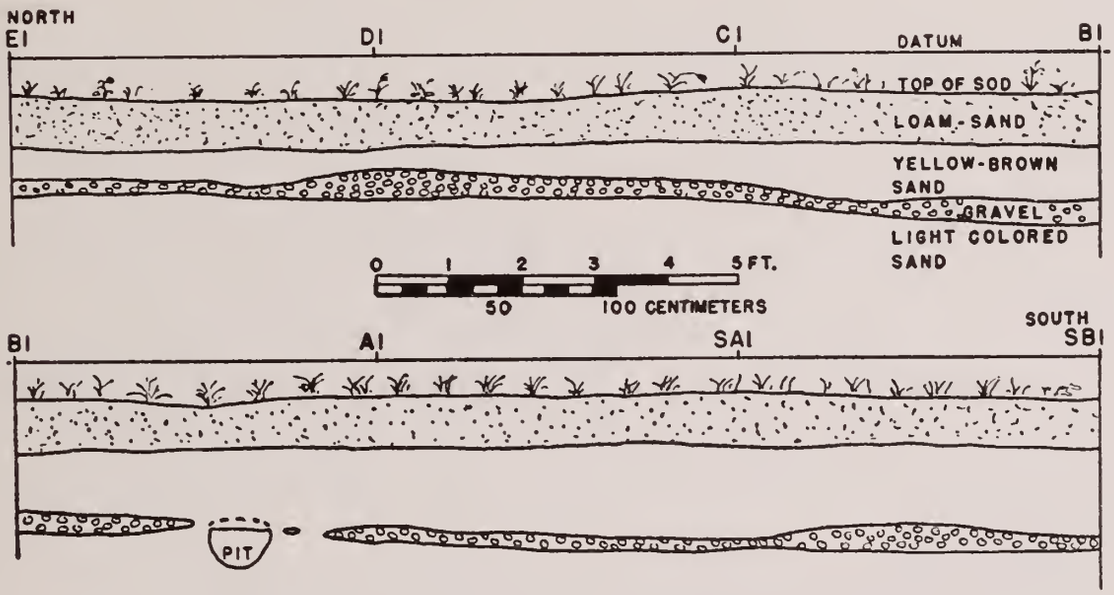

FIG. 3. Foster's Cove: profile along the East 1 line.

brook, is a small sandy knoll (Fig. 6, A). Here chips of quartz and patinated felsite, typical of the lower zones of the main site, were found. As the knoll had been plowed and as no specimens were found in several test holes, excavation was not attempted. The fact that this knoll is at approximately the same elevation as the main site may be significant.

Before our excavations, the Foster's Cove site had not been plowed or disturbed except for lumbering operations. The maximum variation in elevation of any two points on the surface was 27 cm. The site exhibited a moderately well developed podzolic soil profile. Strata, as shown on the sample profile

[20] Bullen, 1946*a*.

(Fig. 3), were designated as loam, yellow-brown sand, gravel, and light colored sand.

Under the sod, the soil was dark brown and consisted predominantly of sand mixed with some pebbles up to 5 cm. in diameter. Towards the bottom of this brown layer, gray lenses were sometimes encountered. Thickness of loam, including the sod, varied from 15 to 25 cm. with a usual value of 21.5 cm. Over most of the excavated area lenses of yellow-brown sand, varying in thickness from a mere trace to as much as 2.5 cm., were found in the loam at a depth of about 12.5 cm. Based on the premise that these lenses resulted from the digging of pits, a habitation level about half way between the top and the bottom of the loam may be suggested.

The underlying yellow-brown sand did not appear to be basically different from the loam. Color differences seemed to be due to a lower content of charcoal, normal processes of weathering, and the development of a soil profile. The yellow-brown sand contained more and larger pebbles than did the loam. The thickness of this sand, while varying from 10 to 38 cm., was usually about 23 cm. As will be noticed from the profile (Fig. 3), this variation was caused chiefly by irregularity in the thickness and vertical location of the underlying layer of gravel.

The gravel layer consisted of many tightly packed water-worn pebbles. Its thickness and relative elevation varied considerably. In places it thinned out to a line of individual pebbles and then disappeared entirely. Top and bottom boundaries were hard to define. The bottom of the gravel was frequently marked by many fine pebbles and coarse sand. This gravel appears to be a fluvial deposit. Beneath the gravel, fine sands of light yellow or gray color were encountered.

Structural features at Foster's Cove consisted of one stone hearth, three stone pavements, thirty-two pits, and fifty-eight post holes located as shown on the excavation plan (Fig. 4).

The hearth was saucer-shaped and made of cobbles, 10-12.5 cm. in diameter. Tops of peripheral stones were in the yellow-brown sand, 12.5 cm. below the base of the loam. The lower surfaces of central stones were barely above the gravel. Charcoal was lying on top of fragmentary rocks in the hearth. A little to the west was a pile of broken and blackened stones, also in the yellow-brown sand, and 10 cm. higher than the hearth. This hearth is similar to one half of the double hearth found at the Hofmann site.

Much of the southern portion of the excavated area contained scattered broken rocks in the yellow-brown sand at a depth af about 12 cm. below the base of the loam. This has been suggested on the excavation plan (Fig. 4) by

the letter "R," where the concentration was particularly marked. When these rocks were close enough to each other to form a "floor," they were considered to be pavements.

Pavement 1 was composed of cobbles, 5-15 cm. in diameter, plus a few broken stones, while the other two pavements were made up predominantly of

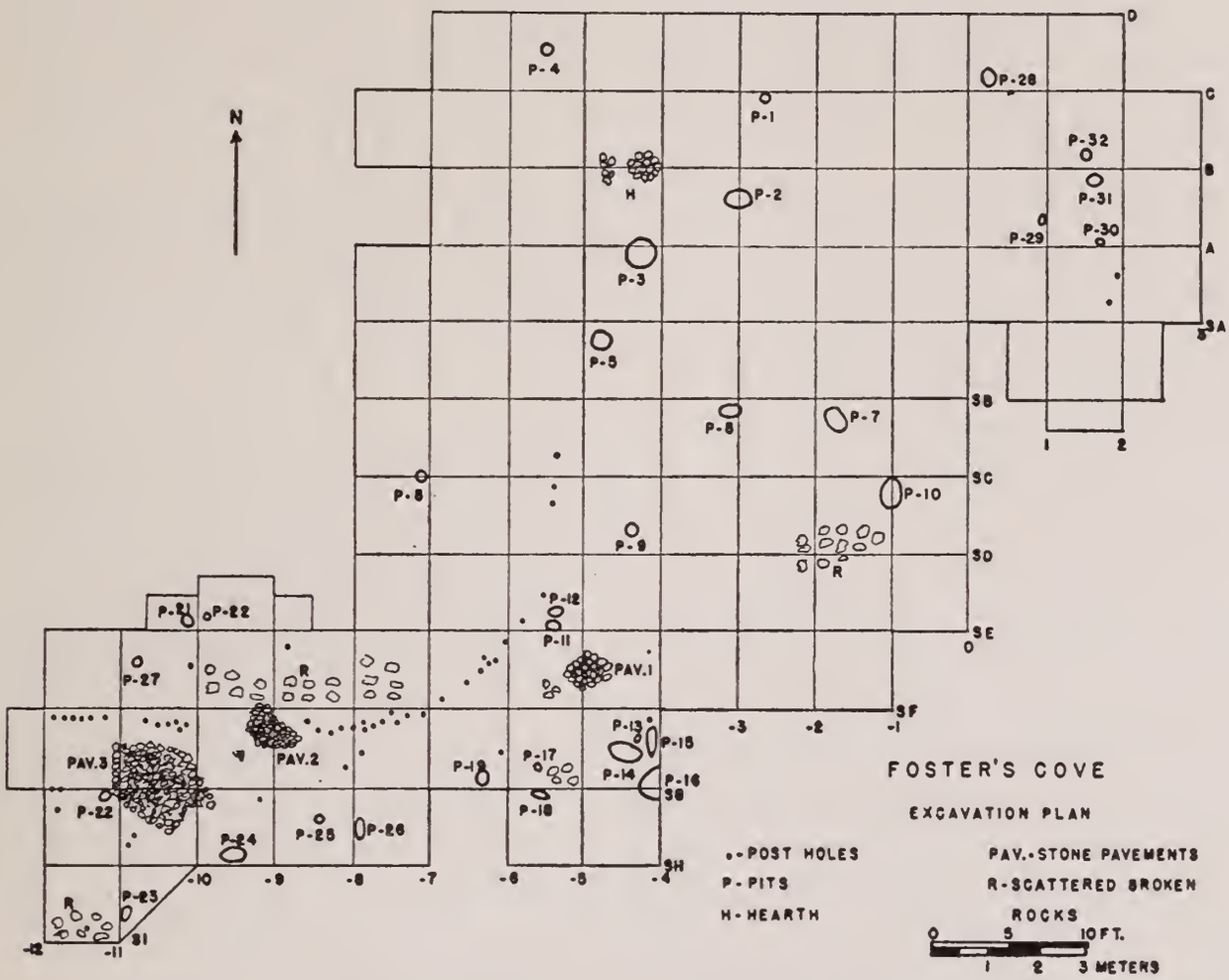

FIG. 4. Foster's Cove: excavation plan.

broken rocks with a few cobbles. Tops of these pavements were 11-15 cm. below the base of the loam, while about 12 cm. of yellow-brown sand separated them from the gravel.

There was no evidence to suggest a possible use for Pavement 1. Many of the stones in Pavement 2 were reddened, but no ash or charcoal was found. Over the northwest corner of Pavement 3, 5-10 cm. higher and just under the base of the loam, was a large deposit of ash, roughly enclosed by seven rocks. In this ash was a small triangular point of quartz. This deposit would seem to postdate the construction of Pavement 3.

One quartz chip was in the yellow-brown sand above Pavement 2, three

were among the rocks of which it was composed, and five chips of red felsite were under it. The differences in materials found at different levels reflects differences in materials found in near-by stratified workshops to be discussed later. Eight quartz chips were above, five in, and six under Pavement 3. These pavements appear to have been used by people who used quartz as material for chipped tools.

Two post holes extended through Pavement 2. That they post-date this pavement is evident from the fact that one of them ended on a fragment of decayed granite obviously forced downward when the post was driven through the pavement.

Slightly lower than the top of Pavement 1 and 25 cm. to the southeast was a partly pecked celt (Pl. V, 13). At the northwest edge of Pavement 3, 7.5 cm. below its top, was part of a semi-lunar knife (Pl. V, 7), while 10 cm. farther to the west and 5 cm. lower than the top of this pavement was an eared trianguloid point (Pl. V, 8).

Eleven of the pits (Fig. 4, Nos. 3, 6, 10, 12, 16,17, 18, 21, 22, 24, and 32) were shallow and basin-shaped, 20-75 cm. in diameter. Their margins could be traced down from the loam. The majority extended about 9 cm. into the yellow-brown sand. At least two of these pits had been dug through the lower 7.5 cm. of loam, as evidenced by charcoal or ash. Two contained nothing but charcoal, while others contained brown sand, charcoal, and an occasional sherd, chip of dark felsite, or piece of bone.

Seventeen other pits (Fig. 4, Nos. 1, 2, 4, 7, 8, 9, 11, 13, 14, 15, 19, 20, 23, 27, 28, 30, and 31) either could be followed down from the loam or were first encountered no more than 5 cm. below the base of the loam. These varied in shape from circular, 17.5 cm. in diameter, to elliptical, 34 × 78 cm., and extended 15-28 cm. below the base of the loam. In two cases they cut into the gravel. They contained brown sand with a little charcoal, occasionally a chip of dark felsite, and, rarely, a sherd of vegetable-tempered pottery near the top. Pit 9 contained a lens of yellow-brown sand at the top. Three coarse mineral tempered sherds were in this lens. The upper portion of Pit 11 was filled with tan-colored sand while the lower portion contained black sand.

The remaining four pits appear to be associated with land surfaces lower than that represented by the loam.

The top of Pit 26, measuring 25 × 68 cm., was found in the yellow-brown sand 11.5 cm. below the base of the loam. Its bottom was 12.5 cm. lower. It contained several quartz chips, material abundant in the upper portion of the yellow-brown sand but not in the loam. Pit 25 was very poorly defined. It consisted of a cache of nineteen moderately patinated felsite chips lying in a

circle, 18 cm. in diameter, in the yellow-brown sand, 15 cm. below the base of the loam. These flakes were all about 4 cm. long and 3 mm. thick. There was a slight suggestion of a pit around the cache but it was not noticed higher up. These two pits seem to represent an intermediate period at the site.

No trace of Pit 5, which measured 45 cm. in diameter and 35 cm. vertically, could be found above a depth of 45 cm., or 21.5 cm. below the base of the loam. There was no gravel layer at this point. The pit extended downwards 23 cm. below the top of coarse sand which is the equivalent of the gravel. It was filled with charcoal representing small branches 5-8 mm. in diameter.

Pit 29 was another cache pit, containing sixty-six large flakes of heavily patinated felsite, each measuring about 6 × 3.5 × 1 cm., surrounding two large worked fragments of gray slate. These flakes were tightly packed together, lying on edge, and occupying a space 17.5 × 10 cm. horizontally and 17.5 cm. vertically. They must have been placed in a pit or they would not have maintained this arrangement. The top of this cache was 15 cm. below the base of the loam. There was not the slightest trace of a pit over this cache but one was readily discernible below it. It was 28 cm. across and continued 19 cm. below the cache, cutting through the gravel. Part of this pit is shown in the sample profile (Fig. 3).

It seems proper to correlate Pits 5 and 29 with the earliest period at the site when, as will be explained later, felsite, which has become heavily patinated, was the popular material for chipped tools.

Post holes have been plotted on the excavation plan (Fig. 4). Included are many of somewhat dubious identity. Post holes varied from 4 to 7.5 cm. in diameter and from 2.5 to 23 cm. in length. Some led down from the loam but others were not found until troweling had proceeded 5-7.5 cm. lower. Seven contained charcoal, chips, or sherds; the others, brown dirt. It will be noticed from the plan (Fig. 4) that these post holes form straight and curved lines but do not seem to enclose any areas. They appear to be related to an occupation represented by artifacts found in the loam and to have no connection with the pavements.

Specimens from Foster's Cove are illustrated in Plates III, IV, and V. Figure 5 gives the vertical distribution of arrow points and scrapers by type and material and a total frequency curve for all stone specimens including unclassifiable fragments.

Large triangular points, small-stemmed points, and small triangular points have general distribution over all the excavated area. Corner-removed points have general distribution over the northern two-thirds of this area, north of the SC line on the excavation plan (Fig. 4). Thumbnail scrapers were found

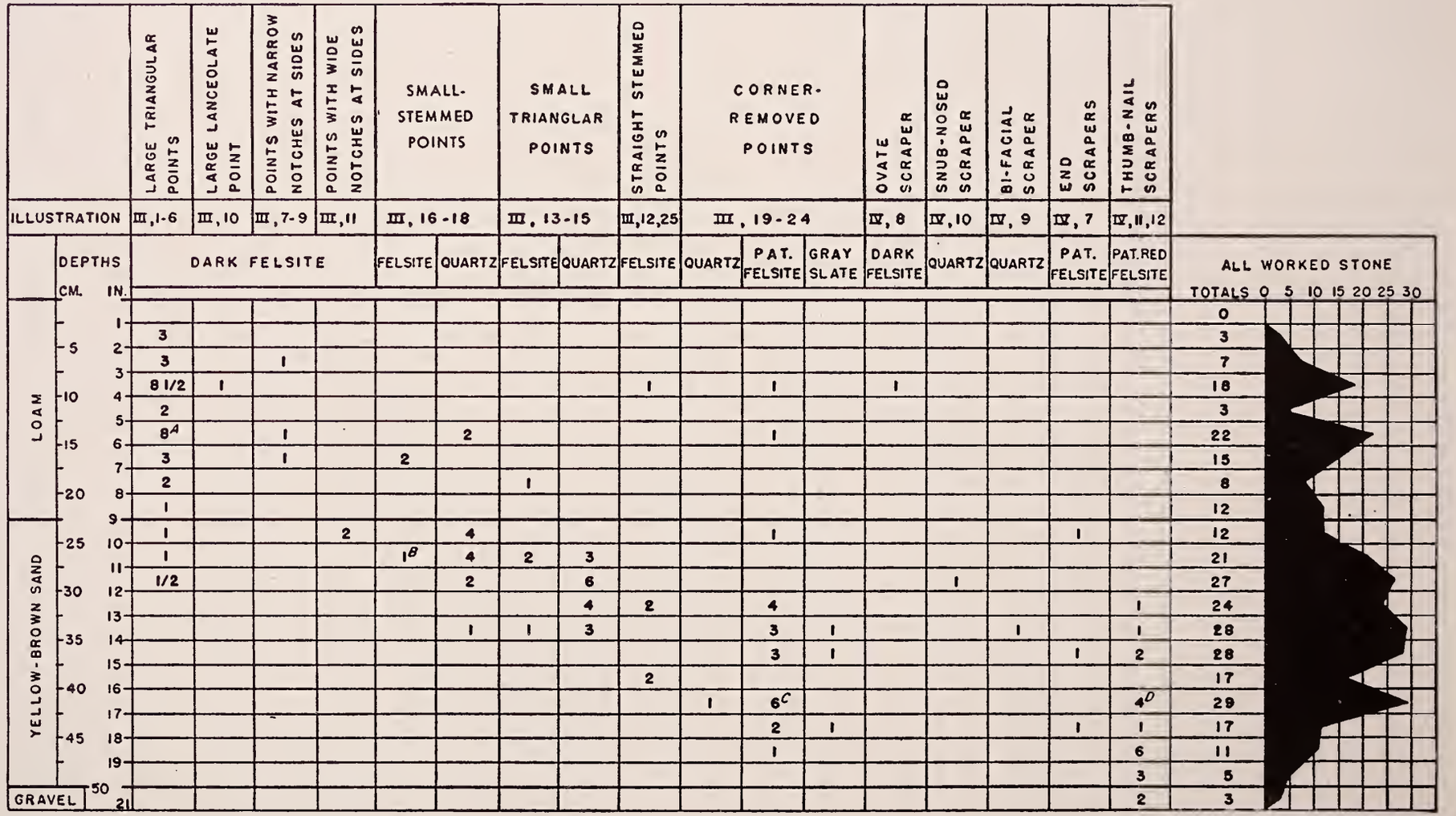

FIG. 5. Foster's Cove site: vertical distribution of stone artifacts. Artifacts in loam plotted from irregular surface of ground, those in yellow-brown sand plotted from base of loam. *A*, includes one made of quartz, but large triangular in form; *B*, made of schist; *C*, includes one spear point; *D*, includes one of black and gray felsite.

chiefly in two areas of red felsite workshop chippings, just south of the SD line, in and around Squares —SF8 and —SE1 (Fig. 4, squares designated by southeast corner stake).

From an examination of Figure 5, it is evident that large triangular points (Pl. III, 1-6) of dark felsite predominate in the loam, small-stemmed (Pl. III, 16-18) and small triangular (Pl. III, 13-15) points of quartz are concentrated in the upper 12.5 cm. of yellow-brown sand, and corner-removed points (Pl. III, Nos. 19-23) of patinated felsite and gray slate are found in the lower zones of yellow-brown sand.

In no 5-foot square was a small-stemmed or small triangular point found in yellow-brown sand below or at the same depth as a corner-removed point. The correlation between type and material is very high but not exclusive. While the zones overlap there is no question but that there are differences from level to level in shapes of points and the materials from which they are made. This gives a tripartite division based on relative depth.

The vertical distribution of some of the forms of points found less commonly at Foster's Cove has significance when it is compared with data from other sites. It should be noted that the large lanceolate point (Pl. III, 10) was in the upper portion of the loam, points with narrow side notches (Pl. III, 7-9) were found only in the loam, points with wide side notches (Pl. III, 11) were found just below the base of the loam, and points of gray slate were found only in the lower levels of yellow-brown sand.

Associated with the large triangular points in the loam were forty sherds of fine mineral-tempered pottery (Pl. V, 1) and two thousand sherds of vegetable-tempered wares (Pl. V, 2). The former were concentrated in the upper portion of the loam. The latter, while occurring throughout the loam, were more numerous in the lower portion. Forty-one sherds of coarse mineral-tempered pottery (Pl. V, 3) were found. Thirty-four of these were extremely small and were not recognized as coarse mineral-tempered sherds during excavation. Of the balance of seven upon which measurements of depth of occurrence are available, one was 16.5 cm. deep in the loam, three in the yellow-brown lens in the top of Pit 9, and four in the yellow-brown sand 2.5-6.5 cm. below the base of the loam. The latter corresponds to the vertical location of the two points with wide side notches. No sherds of vegetable-tempered wares were found in the yellow-brown sand.

Thus we find at Foster's Cove, as at the Hofmann site, evidence that coarse mineral-tempered pottery is older locally than vegetable-tempered wares. Concentration of fine mineral-tempered sherds at shallower depths suggests that that ware is the latest of the three.

In addition to projectile points, the list of chipped implements found at Foster's Cove includes knives, scrapers, and drills. Distribution of these forms implies that there were differences in forms and materials employed similar to those suggested by the distribution of projectile points (Fig. 5). The small quantities involved make one hesitate to say so definitely, but the vertical distribution will be given below and correlations will be suggested.

Four hafted knives (Pl. IV, 1-2) were found in a zone 7 cm. in depth which included the base of the loam. One flake knife (Pl. IV, 3), two ovate knives (Pl. IV, 4), and four asymmetric trianguloid knives (Pl. IV, 5) were found in the upper portion of the yellow-brown sand with a vertical range approximately equal to that of the small triangular points. Five trapezoidal knives (Pl. IV, 6) were in the yellow-brown sand, with a distribution similar to that of corner-removed points. The last-named knives were heavily patinated.

The simple drill (Pl. IV, 13) of dark red felsite came from the loam. Four other drills (Pl. IV, 14-17) were in the yellow-brown sand, situated 6, 12.5, 16.5, and 19 cm. respectively below the base of the loam. One (Pl. IV, 16) from the lowest zone has a corner-removed base.

Scrapers are illustrated in Plate IV, 7-12; their vertical distribution is given in Figure 5. The ovate scraper of dark felsite (Pl. IV, 8), found in the loam, does not differ significantly from some of the patinated red felsite scrapers found in workshops deep in yellow-brown sand. In the course of time, scrapers at Foster's Cove seem to have undergone less change, typologically, than have other chipped tools. Differences in material reflect changes in preference for material used for arrow points.

In the loam, associated with large triangular points and pottery, were two chips of brown flint, possibly English flint, two small fragments of much-scored soft graphite, two possible mullers or rubbing stones of Dracut Gabbro, a pecked fragment which suggests by its shape that it might be from the butt end of an axe, and a fragment of a gouge-like tool. The latter, 3 cm. long and 5 mm. thick, is chipped on its convex lower surface and polished on its concave upper surface on which partly obliterated striations may be seen. The two surfaces meet to form a slightly curved cutting edge similar to that of a gouge.

In yellow-brown sand, at levels which would seem to associate them with small-stemmed and small triangular points were three "beach pebble" hammerstones of granite (Pl. V, 14). Five "battered ball" hammerstones (Pl. V, 6), three of quartz, one of red and one of gray felsite, and two quartz cobbles with abrasion marks on one end were found in the lower levels of the yellow-brown sand.

A partly pecked celt, a fragment of a semi-lunar knife, an eared trianguloid point, and a grooved hammer (Pl. V, 13, 7, 8, and 5) were found near and slightly lower than the pavements. At intermediate depths in the yellow-brown sand were two choppers, part of another semi-lunar knife, and two gouges (Pl. V, 4, 9, 11-12). Proveniences of small fragments of two other gouges and two faceted pieces of impure graphite are similar.

Fragments of another semi-lunar knife and a badly disintegrated specimen of green schistose rock measuring 12.5 × 4 × 1 cm. occurred 17.5 cm. below the base of the loam and probably coincide with what should represent a period at the site when corner-removed points were the prevailing type. One or two areas on the surface of the specimen of schistose rock suggest that it was once polished. It and one of the gouges (Pl. V, 12) appear to have affinities with specimens reported from "Red Paint" graves in Maine.

I have already stated that the thumb-nail scrapers of patinated red felsite (Pl. IV, 11-12) were found chiefly in two areas of workshop chippings in and around Squares —SF8 and —SE1 (Fig. 4). Not only were these areas deep in the yellow-brown sand but they were under parts of other workshop areas in the upper portion of the yellow-brown sand which were characterized by quartz chips; these in turn were under parts of workshop areas marked by chips of dark felsite occurring in the loam. The following tabulation gives the situation in Square —SF8.

Occurrence of Chips, Sherds and Red Felsite Scrapers in Square —SF8

Depths below top of sod	Sherds	Chips			Red felsite scrapers
		Dark felsite	Quartz	Red felsite	
Loam					
0-25 cm.	25	50	–	2	–
Yellow-brown sand					
26-45 cm.	–	–	727	3	–
46-50 cm.	–	–	–	–	1
51-55 cm.	–	–	–	Many	3
Gravel	–	–	–	–	–

The situation in Square —SE1 was a little different as the main part of the quartz workshop was not directly over but to one side of the red felsite workshop. This quartz workshop was in Square —SF2 which meets Square —SE1 at its corner (Fig. 4). The quartz workshop of Square —SF2 was reflected in

Square —SE1 by some quartz chips and a concentration of small broken rocks which did not form a pavement. The stratigraphic relationships are given in the following tabulation.

OCCURRENCE OF CHIPS AND SHERDS IN SQUARE —SF2 AND SQUARE —SE1

	Square —SF2					Square —SE1					
		Chips						Chips			
Depths below top of sod	Shds	Dark fels	Gray fels	Qtz	Red fels	Shds	Broken rocks	Dark fels	Gray fels	Qtz	Red fels
Loam											
0-20 cm.	80	35	—	—	—	44	11	38	1	3	6
Yellow-brown sand											
21-27 cm.	—	—	2	110	—	—	60	—	1	2	3
28-35 cm.	—	—	2	230	2	—	277	—	3	15	11
36-42 cm.	—	—	2	6	2	—	52	—	3	7	57
43-50 cm.	—	—	Gravel		—	—	—	—	1	—	168
51-58 cm.	—	—	Gravel		—	Gravel		—	—	—	66

Among the quartz chips of Square —SF2 were seven whole or fragmentary quartz specimens, six in the 21-27 cm. zone and one in the 28-35 cm. zone. Among the red felsite chips of Square —SE1, in the 43-50 cm. zone, were four red felsite scrapers and four fragments which fitted together to form a large scraper (Pl. V, 10).

In the northern two-thirds of the excavated area, superimposed workshops in the yellow-brown sand could not be demonstrated. Dark felsite was predominant in the loam. In the yellow-brown sand the ratio of quartz to patinated felsite decreased as depth increased, but relationships were not as clean cut as in the situation given above.

The stratigraphic arrangement of these workshops, together with differences in the shape of projectile points and in material from which they were made, observed at different depths, as indicated in Figure 5, is strongly indicative of three different stages in the culture of the aborigines. It does not seem, however, that we have three distinct and separate entities but that we are dealing with phenomena of culture change. The evidence from Foster's Cove indicates that two major periods were represented there. The earlier one, evidenced by artifacts found in the yellow-brown sand, was a period of transition or change. Corner-removed points were replaced by small triangular points and small-stemmed points. The preferred material for chipped tools became quartz instead of felsite. The later period, represented by large triangular points and pottery found in the loam, reflects little change in industrial products.

The curve of vertical frequency for all worked stone (Fig. 5) indicates that the above conclusion should be the correct one. Examination of this curve shows two peaks and a sudden dip in the loam, a rather wide valley at the base of the loam, and two or three small peaks and corresponding dips in the yellow-brown sand.

As mentioned earlier, lenses of yellow-brown sand were found in the loam at a depth of about 12.5 cm. It was suggested that they were the result of pits dug from that level. This depth, 12.5 cm., coincides with the sudden dip of the curve of vertical frequency for artifacts found in the loam. It will be noticed that two small-stemmed points of quartz and two corner-removed points were found in the loam just above and just below this dip (Fig. 5). It seems proper to assume that their position here, like that of the lenses of yellow-brown sand, is a result of the digging of pits.

The lesser frequencies at the base of the loam suggest an hiatus. The fact that the deepest pottery is found at about this level, and that, except for those discussed above, there is a lack of small triangular, stemmed, or corner-removed points at higher levels, is suggestive of a sudden break in the history of the site. One may ask whether the method of plotting used in Figure 5, where specimens in the yellow-brown sand are plotted from the base of the loam, may not have produced this suggestion of an hiatus. This is not the case, because if the depth of specimens be plotted from the surface, as was done in the original Foster's Cove report,[21] this valley is just as prominent.

No hiatus is indicated in the lower portion of the curve representing occurrences in the yellow-brown sand. The sharp dip at 40 cm. reflects the lack of any corner-removed points or scrapers in a zone 2.5 cm. wide, while they were found above and below. This dip must be disregarded. The curve for yellow-brown sand appears to be a normal frequency curve skewed towards the bottom by the scrapers from the two deep workshops.

At Foster's Cove there is difficulty in determining the source of the sand in which artifacts were buried. The Shawsheen River does not rise sufficiently in times of flood to overflow the site. No suggestion of water deposition was found above the gravel layer. The sand contained too many large pebbles for any substantial deposition by wind. While kames and sandy ridges are found to the south and east, they are not directly adjacent to the site (Fig. 6). This would seem to eliminate slope wash, at least in recent times.

As an hypothesis, it may be suggested that sand and gravel knolls, abundant in the vicinity, may have been present at the site when the first Indians arrived. They may have lived in one or more convenient hollows. During the passage of time, local slope wash, abetted by the killing off of natural cover, people walking, and children playing on the slopes may have gradually leveled the

[21] Bullen, 1946*a*, Fig. 14, p. 34.

whole area and buried the artifacts. Such a process would fit in well with the observed facts.

For comparison with the Hofmann site it should be noted that none of the corner-removed points from Foster's Cove are thick, large, or heavy like most of those from the Hofmann site. Even the two spear points are not heavy. It might also be mentioned that the size of triangular points found in the loam was, on the average, larger at Foster's Cove than at the Hofmann site.

The diet of the inhabitants at Foster's Cove is suggested by bones of deer, beaver, muskrat, turtle, and snake. One unidentifiable bird bone was also found. A charred acorn and two fragments of fresh water clam shell complete the inventory of remains of possible foods.

It is evident that the inhabitants of Foster's Cove lived very similar lives to those at the Hofmann site. They both made hearths and pavements, dug pits, prepared food, and made tools. Gouges may indicate that dugout canoes were made at Foster's Cove. Certainly dugout canoes could not be used at the Hofmann site due to the small size of the brook. Presence of semi-lunar knives and other large artifacts at Foster's Cove and their absence at the Hofmann site does not prove that these tools were unknown to the inhabitants of the latter site.

SURVEYED AND TESTED SITES

THE previous chapter has described the two sites at which major excavations were carried on. In this chapter we shall deal with the sites which were surveyed and tested. As we have previously said, they will be discussed in convenient geographical units. Sites will be described as fully as the data recoverable from them warrants. Numbers following the names of sites refer to numbers on Figure 1, in which the location of each is shown.

SITES AT HAGGETT'S POND

Fraser, Site 17

On the farm of Miss E. R. Fraser is a large field, recently planted to corn, which is usually referred to as the Haggett's Pond Site. It is located on a level plateau about thirty feet above the west shore of the pond. To the north and south are small brooks. This field has been plowed for many years and has long been hunted by collectors. Only an occasional chip was found in several test holes.

A wood lot which lies between the corn field and the pond was at one time plowed land, but it has not been cultivated for a long time. A test pit, measuring 9 × 6 feet, was made in this wood lot. The profile exposed coarse sandy loam about 18 cm. thick which had been plowed; yellow-brown sand, about 20 cm. thick, containing a vast number of small pebbles; and underlying light colored sand and gravel. Quartz chips, calcined bone, broken rocks, and a few felsite chips were found in the upper 10 cm. of the yellow-brown sand and small pebbles. With these chips were found a typical small triangular point and a fragment of an asymmetric trianguloid knife, both of moderately patinated felsite, and two fragments of worked quartz.

In other tests in the wood lot the same profile appeared and quartz chips were again found in the upper part of the yellow-brown sand and small pebbles. Except for a very rare chip, nothing was found in the loam.

It may be pointed out that this association, both as to types of artifacts and material, is the same as that found at Foster's Cove at the same relative depth.

It has proved impossible to obtain a large series of projectile points collected from the corn field at Fraser's farm. Examination of small collections and talks with collectors make it evident that small triangular points of quartz were the most common type and that the next most frequent form consists of small-stemmed points, also of quartz. Some small triangular points and a few

notched and corner-removed points of felsite are reported. A very few small sherds of coarse mineral-tempered pottery have also been found. Apparently extremely few, if any, large triangular points were ever present.

The above assemblage of artifacts is what would be expected if the Fraser site represented the same cultural range as that represented by the upper portion of the yellow-brown sand at Foster's Cove.

Barron, Site 91

This site covers about three-eighths of a mile along the southwestern shore of Haggett's Pond. It is separated from the pond by a steep bank, about twenty-five feet high, and divided into two parts by a small brook flowing behind Barron's service station on the Andover-Lowell road.

Tests were made in various parts of this site, particularly at the residences of Mr. A. K. Innes and Mr. Eugene Henderson on Haggett's Pond Road. Here the land is a level sandy plateau bordered on the west by a high hill. This sandy plateau continues across the brook to the southeast but is not there adjacent to a hill. In all tests the profile consisted of plowed sandy loam, about 25 cm. thick, yellow-brown sand about 25 cm. thick, containing a few pebbles, and underlying light colored sand and gravel.

At Innes', chips of quartz were found in a zone 10 cm. thick, the top of which was in yellow-brown sand 5 cm. below the base of the loam. With these chips were found broken rocks, some fragments of worked quartz, and what appears to be part of an asymmetric trianguloid knife of moderately patinated felsite.

At Henderson's, about 50 feet south of Innes', a few chips of felsite were found in the loam, and many chips of moderately and heavily patinated felsite occurred in the upper 23 cm. of yellow-brown sand. With these chips were several worked fragments of felsite and the base of a corner-removed point.

While these tests were rather meager in results, it will be noted that, as at Foster's Cove, quartz was found in a narrow zone in the upper portion of the yellow-brown sand, while patinated felsite was found in this same zone and also deeper.

Mr. Boutwell of Andover, Massachusetts, has found more corner-removed points at Barron's than at Fraser's. This agrees with the findings of the survey.

East Shore, Site 111

An irregular sand and gravel ridge extends along the east shore of Haggett's Pond, between it and swampy land. Some chips, but no evidence of heavy occupation, were found on this ridge.

SITES ON LOWER SHAWSHEEN RIVER

Of the fifteen sites on the lower Shawsheen River, seven, Sites 1-4, 12, 13, and 55, were reported to the Museum by collectors, but could not be located by the survey.

Acme Dressed Poultry Company, Site 108

This site, near the river, on the lower part of a sloping field, is probably an extension of Site 3, on the Green farm to the east. Here, south of the plant of the Acme Dressed Poultry Company, chips of felsite and quartz and the basal portion of a corner-removed point were found. A test hole showed the ground to have been much disturbed.

Lawrence Stadium, Site 54

The eastern part of the South Lawrence Memorial Park appears to represent an old sand dune. Chips of quartz and patinated felsite were found.[22]

Shawsheen River #1, Site 109

Surface collecting on this sandy, sloping field produced a few quartz and felsite chips and a small-stemmed point of quartz, exposed by erosion. Test holes failed to produce chips underground but did uncover evidence of early White occupation.

Frye Village, Site 110

This site is a large level sandy field about 30 feet above the Shawsheen River. It has been much disturbed by plowing and leveling for house lots. Only a few chips could be found. Mr. Boutwell found a few sherds of pottery here years ago.

Roger's Brook, Sites 106 and 107

These two sites are located on opposite sides of the mouth of Roger's Brook. Both sites have been disturbed but appear to have been originally small, fairly level areas about 25 feet above the river. At Site 107 were found a few chips of quartz and patinated felsite. At Site 106, the finer surface material has either eroded away or been removed, leaving a very gravelly surface. On this surface were found chips of quartz and of both patinated and unpatinated

[22] Since this was written, Mr. Wallace Smith, of North Andover, has reported the finding of scrapers of patinated felsite and jasper, a plummet, drills of dark felsite, a knife, and quartz turtlebacks at this site.

felsite, a sherd of coarse mineral-tempered pottery, and two fragments of a long, narrow, stemmed point of dark felsite.

This site may be of historic interest. Roger's Brook is named for an Indian who lived somewhere near the brook. The Indian deed for Andover reads:

> At a General Court at Boston 6th 3^{d} mo. 1646 Cutshamache, Sagamore of y^{e} Massachusetts [sold] all his right interest & privilege in y^{e} land *** pvided y^{t} y^{e} Indian called Roger and his company may have liberty to take alewives in Cochichawicke (now Shawsheen) River, for their own eating; but if they either spoyle or steale any corne or other fruite to any considerable value of y^{e} inhabitants there, this liberty of taking fish shall forever cease, and y^{e} said Roger is still to enjoy four acres of ground where he now plants.[23]

Roger's four acres is supposed to be about a quarter mile to the east of Site 106 because a large rock there, now removed, was called Roger's Rock. As the available land around Site 106 is about four acres, and on the river, this site would seem to be a more likely candidate for Roger's home than the location of the rock, where the land is sloping.

Foster's Farm, Site 25

Two large cultivated fields, separated by a small brook, slope gently downward towards the river. Test holes on the higher areas away from the river produced many more chips than did those on the lower land near the river. Due to plowing and lack of depth of yellow-brown sand, excavation did not seem warranted.

Abbott, Site 18

A small bluff rises about 20 feet above the west bank of the river opposite Foster's Farm site. To the north and south of this bluff the fields slope downward to the river. Test holes failed to find chips, except on the bluff. There quartz chips were found, as at Foster's Cove, in the upper 12.5 cm. of yellow-brown sand. The plowed loam of the test hole was sterile. A plummet was found at this site several years ago by Mr. Benjamin L. Smith, of Concord.

SITES NEAR POMP'S POND

Figure 6 shows the region around Pomp's Pond and the location of six sites; Foster's Cove, on the Shawsheen River; Camp Maud Eaton, Town Beach, Ice House, and Camp Manning, on Pomp's Pond; and Spring Grove Cemetery, to the east. Indians inhabited every available level area which was fifteen or more feet above adjacent water. The map indicates numerous kames

[23] Bailey, 1880, p. 27.

and kettle holes, characteristic of the region. It may be interesting to note that sherds and chips were found on the bare gravel surface of the top of the highest kame (Fig. 6, B).

Spring Grove Cemetery, Site 26

Practically nothing is known about this site. It was partially disturbed when a railroad cut was made many years ago. More recently it has been regraded for a cemetery. The site surrounded a small spring which is now completely buried. Both Mr. Hofmann and Mr. Boutwell found Indian material here before the regrading.

Camp Maud Eaton, Site 80

This site (Fig. 6), at Camp Maud Eaton,[24] a Girl Scout camp, was sampled by means of a series of test squares.[25] Only three of these will be mentioned. All squares were located with reference to a base line.

Test V included an area of 125 square feet. The sandy loam was about 15 cm. thick and contained pebbles up to 7.5 cm. in diameter. In this loam were found twelve sherds, eight with coarse, mineral temper, three with fine mineral temper, and one with vegetable temper; thirty-nine chips, chiefly of dark felsite; and a stemmed point of dark felsite. No sherds were found below the base of the loam. The underlying yellow-brown sand, from the base of the loam downward, contained a great many pebbles and cobbles up to 18 cm. in greatest dimension. At a total depth of about 30 cm. these stones represented about 30% of the deposit. Mixed with this sand and gravel, down to a depth of 30 cm., were two hundred thirty chips, chiefly of patinated felsite but including twenty-six of quartz and twenty-four of gray slate. In a narrow zone, representing the upper 5 cm. of yellow-brown sand, were two small triangular points and several worked fragments, all of quartz. Below these was a narrow corner-removed spear point of gray slate. This test revealed that the different materials and objects made from them are found at different depths in a manner similar to that observed at Foster's Cove.

A plan and some profiles from Test VI will be found in Figure 7; specimens secured there are illustrated in Plate VI. This test, covering 250 square feet, was made where there was a slight dip in the surface of the ground. The profiles show three superimposed hearths in the southeastern part of the excavation. In the northeastern portion of the test, as shown in the profiles, was a tongue of loose sand and gravel including pebbles and cobbles up to a diameter

[24] Bullen, 1946*b*.

[25] *Ibid.*, Fig. 15, p. 36, shows the location of these tests.

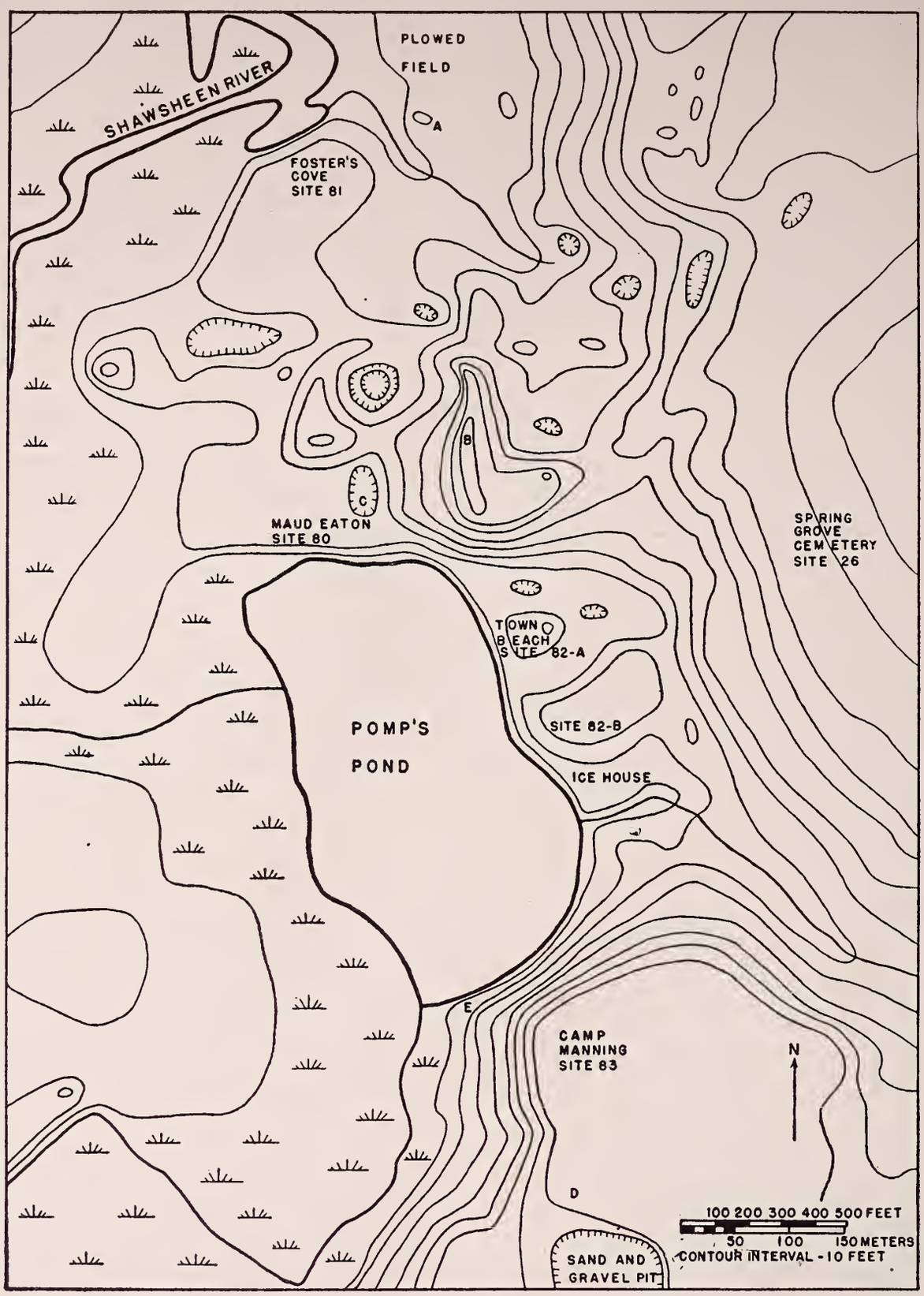

FIG. 6. A map of the area about Pomp's Pond, Andover, giving locations of Indian sites. Letters refer to features discussed in the text. After Lawrence sheet, U.S.G.S., 7½ minute series.

of 17.5 cm. Chips, specimens, and calcined bone were found in and under this loose sand and gravel. Patches of compact sand and gravel, generally occurring at greater depths, will also be seen (Fig. 7). All of this suggests that Indians settled in a depression, possibly a small kettle hole, and that, during occupancy, slope wash accelerated by the occupation filled in the depression.

The four hearths (Fig. 7) were all saucer-shaped structures, 68-106 cm. in diameter, paved with one course of cobbles, 7.5-15 cm. in diameter. Charcoal was found in and just below these hearths. Hearth 1 was unique in that it was capped by pebbles, 2-5 cm. in diameter. They probably represent the result of slope wash. A large quartz core was built into Hearth 3. Charcoal from Hearth 4 extended to the north, beyond the hearth proper, and was mixed with gravel. Here, at a depth of 30 cm., were found remnants of two charred logs, measuring 23 × 7.5 and 18 × 5 cm. respectively, which appear to have been pulled out of the fire. In the excavated portion of Hearth 4 were four sherds of coarse mineral-tempered pottery.

In the loam, associated with three points with narrow side notches (Pl. VI, 5-7) and an asymmetric trianguloid knife (Pl. VI, 8), all of dark felsite, were forty-six sherds of coarse mineral-tempered pottery (Pl. VI, 1-4), ten sherds of fine mineral-tempered pottery, and eleven sherds of vegetable-tempered wares. All of the latter were in the area over Hearth 2 (Fig. 7) and so could not, presumedly, be relatively early.

In the top 10 cm. of yellow-brown sand were one hundred eighty sherds of coarse mineral-tempered wares, sixty-seven with impressions of cord- or textile-wrapped paddles(Pl. VI, 10) and one hundred thirteen with a sandy, wiped surface (Pl. VI, 9). Two basal fragments of points with wide side notches (Pl. VI, 11) were found, one just above and the other just below these sherds. Otherwise, only fourteen sherds, all mineral-tempered, were found in the upper 10 cm. of yellow-brown sand; none were found lower.

Other specimens in the yellow-brown sand included a narrow triangular (lanceolate) quartz point, various small-stemmed points, chiefly of quartz, and a hafted knife (Pl. VI, 12-21). In the transition zone at the base of the yellow-brown sand were a corner-removed point (Pl. VI, No. 22) and part of an asymmetric trianguloid knife.

In the loose sand and gravel, or in sand at greater depths to the south (Fig. 7), were found corner-removed points (Pl. VI, 23-27), a percussion-flaked tool (Pl. VI, 29), and a semilunar knife (Pl. VI, 28). The latter was 8 cm. below the top of the sand and gravel and must be associated with corner-removed points.

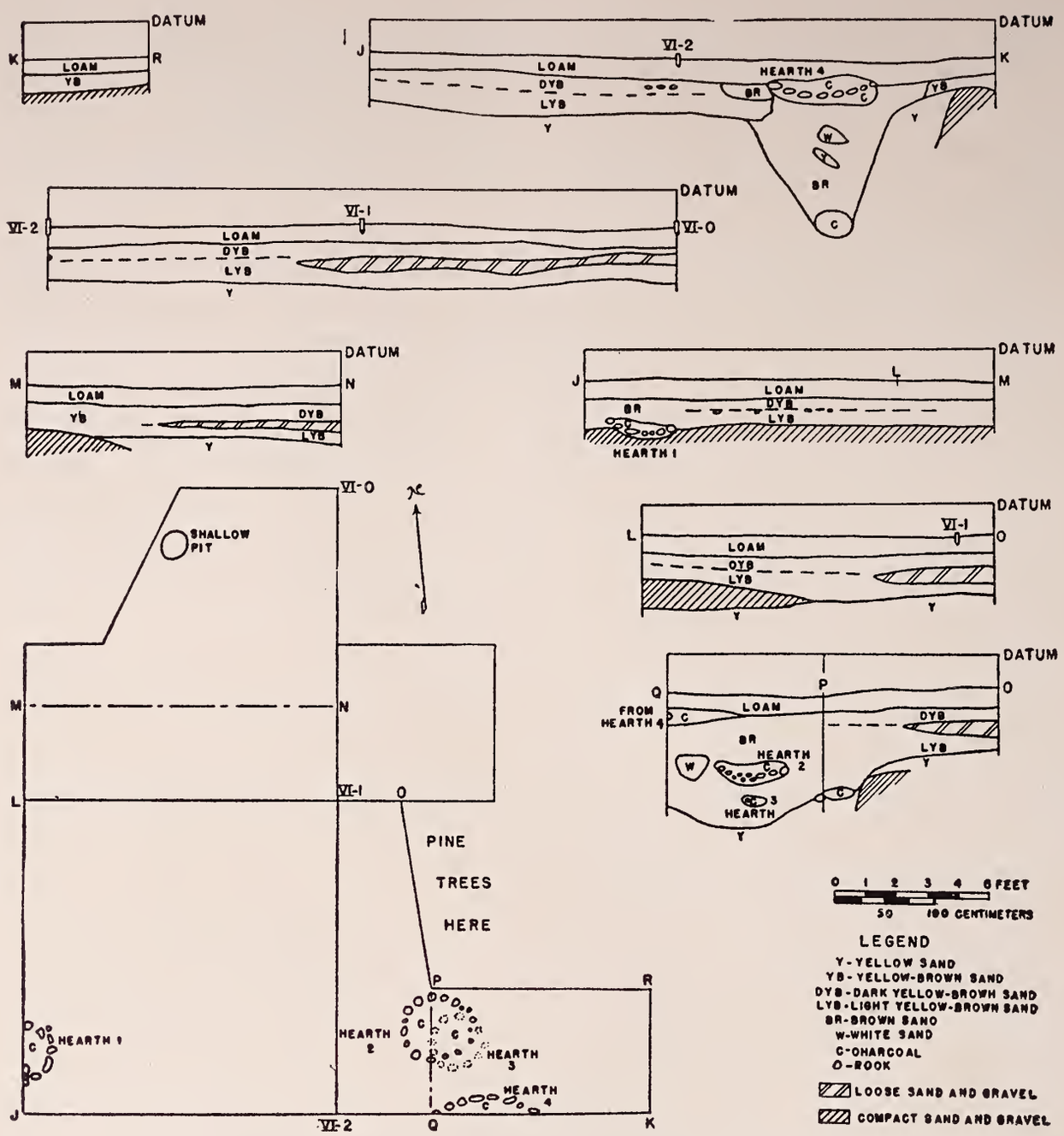

FIG. 7. Camp Maud Eaton: Test VI, excavation plan and profiles.

The similarity between the archaeological content of this test and that at Foster's Cove is striking. As at Foster's Cove, we have corner-removed points of patinated felsite, gray slate, and one of quartz, occurring at greater depths than small-stemmed and triangular points, chiefly of quartz which, in turn, underlie dark felsite points with narrow side notches. It will be remembered that the only points of the latter type at Foster's Cove were found in the loam, as was the case in this test. Just below the base of the loam, as at Foster's Cove, were points with wide side notches. Here they were definitely associated with

coarse mineral-tempered pottery; such association could only be inferred at Foster's Cove. Also, the evidence from this test substantiates the scant evidence from Foster's Cove and from the Hofmann site to indicate that coarse mineral-tempered pottery is older than vegetable-tempered wares.

East of Test VI and just south of Test V, Hofmann excavated a small hearth that differed a little from those previously described. The top was 2.5 cm. above the base of the loam while the bottom was 12.5 cm. deeper, and in yellow-brown sand. This hearth was 29 cm. in diameter and paved with several courses of pebbles, 5-7.5 cm. in diameter. Ashes, charcoal, and four coarse mineral-tempered sherds were in the hearth. Near the periphery were two hundred similar sherds, all representing one vessel. It had a slightly everted lip, plain rounded rim, and undecorated neck. Body sherds were decorated by rows of curved marks made by fingernail, hollow reed, or curved tool. In yellow-brown sand, 40 cm. west of this hearth and below any of the pottery, was a corner-removed point of quartz.

In Test VII, some distance to the east, loam was underlain by yellow-brown sand, then loose sand and gravel, and at the bottom, compact sand and gravel. The specimens which were found are illustrated in Plate VII. Also included is a specimen of graphite (Pl. VII, 4) from the loam of a small test made in 1944, about 10 feet to the north. The area of Test VII was 150 square feet.

The sandy loam of this test contained a few pebbles, 2.5-5 cm. in diameter. The top of the yellow-brown sand contained a great many fine pebbles, but otherwise only one or two pebbles were encountered until the top of the loose sand and gravel layer was reached. The latter layer, containing many cobblestones as large as 12.5 cm. in diameter, blended into the underlying compact sand and gravel. Along the middle of the southern side of this test, the loose sand and gravel petered out, while in the middle of the test area a lens of yellow-brown sand, about 7.5 cm. thick, separated it from the compact sand and gravel.

Mixed together in the loam of Test VII were seventy-two sherds of fine mineral-tempered wares, representing three vessels, one with an incised design (Pl. VII, 1) and two with collars similar to those on Mohawk vessels (Pl. VII, 2), three sherds of coarse mineral-tempered pottery, scored graphite (Pl. VII, 4), a point with narrow side notches (Pl. VII, 5), four very large triangular points (Pl. VII, 6-7), two large lanceolate points (Pl. VII, 8), and four fragments of English (?) flint (Pl. VII, 3). In the upper portion of the yellow-brown sand was what appears to be a fragment of a brass arrow point. It will be noticed that these associations are different from those pre-

viously found. Mohawk-like collars and English (?) flint are certainly late and from this association it may be judged that very large triangular points are the latest in the region.

Two of the large triangular points and one of the lanceolate points, all of dark red felsite, were apparently made here, as four hundred thirty-five chips of this material, chiefly trimming chips, were found in the loam. Only four similar chips were in underlying yellow-brown sand. Twelve chunks or cores of red felsite were found in the upper part of the loose sand and gravel. These

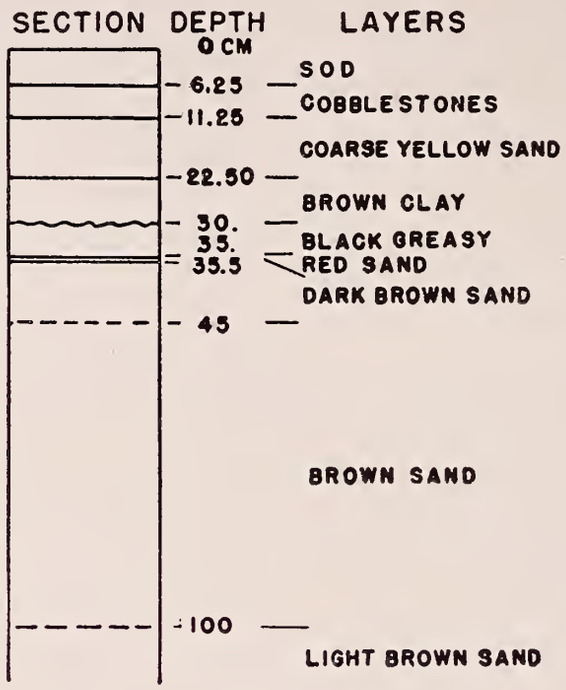

FIG. 8. Camp Maud Eaton: section in kettlehole.

were all heavily patinated, light red instead of dark red in color, and unaccompanied by chips. They do not appear to have any connection with the dark red felsite points and fishing chips from the loam but, rather, to be quite distinct, in further support of evidence for stratigraphic sequence already uncovered.

While the inventory of the lower zones of Test VII is meager (Pl. VII, 9-14), similarities to Tests V and VI (Pl. VI) will be noticed. Quartz, in the form of an asymmetric trianguloid knife (Pl. VII, 9), occupied an intermediate position. The fragment of polished slate (Pl. VII, 13) was found in the same relative position as the semilunar knife of Test VI, that is, it lay in the loose sand and gravel, 8 cm. below the top of that layer. This fragment could be part of another semilunar knife.

As excavations at Camp Maud Eaton indicated that slope wash might be

an important factor, an excavation was made in one of the kettle holes (Fig. 6, C). A diagram of the strata exposed on one side of this hole is given in Figure 8. No evidence of occupation was found. The layer of cobblestones just under the sod was extremely compact. Presence of this layer is of interest, as similar, but less compact, layers in the excavations both contained and overlay cultural material. The black greasy deposit included what appeared to be partially oxidized wood in the form of small branches, bark, and larger fragments. This deposit, together with the overlying sandy clay, suggests that at some time water stood in this kettle hole.

While the chances of success do not appear too bright, there is a slight possibility that the disciplines of geology and botany might shed some light on

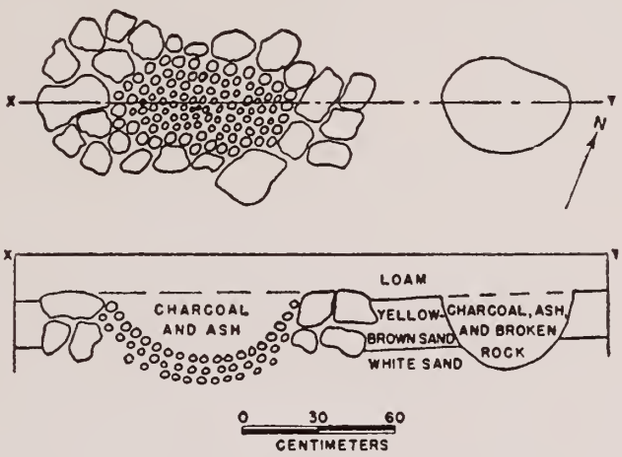

FIG. 9. Ice House Site: hearth and associated pit. From notes of A. M. Hofmann.

the antiquity of the culture-bearing layers of loose sand and gravel at Maud Eaton. Apparently slope wash has substantially modified the topography of this region.

TOWN BEACH, SITE 82-A

At the Andover town beach, on the northeast shore of Pomp's Pond, is a small knoll of sand and gravel devoid of loam and vegetation (Fig. 6). Years ago, before the construction of the present bath house, Mr. Hofmann found quartz chips and small-stemmed points of quartz at this site.

ICE HOUSE, SITE 82-B

At present, the available level area of this site, damaged when an ice house was built, is only about 75 × 150 feet and much of that consists of a thin covering of loam on top of gravel (Fig. 6). Hofmann excavated part of this area and has kindly permitted inclusion of the following data taken from his field notes.

A complicated hearth and associated pit (Fig. 9) was found. This structure combines the idea of a hearth with that of a pavement. The hearth proper was made of large pebbles, 5-7.5 cm. in diameter, while the surrounding apron was built of two courses of broken rocks averaging about 20 cm. in greatest dimension. The latter must have been brought to the site. In the deposit of charcoal and ash in the hearth was a corner-removed point of patinated felsite. A straight-stemmed point was among the rocks forming the apron.

Stratigraphic evidence concerning the sequence of forms was also found. Three small triangular points of dark felsite were in the loam at depths ranging between 9 and 14 cm. While small in size, these points had the characteristics of large triangular points—straight sides and sharp corners. In yellow-brown sand, at depths of 10-15 cm. below the base of the loam, were found a small, small-stemmed point of quartz, a fragment of impure graphite, and what appears to be part of an asymmetric triangular knife of moderately patinated felsite.

Except for the presence of a corner-removed point in the hearth, suggestions of stratigraphy to be gained from Hofmann's work at this site, while slight, agree with those found at Foster's Cove. Triangular points of dark felsite were in the loam; quartz, including a small-stemmed point, and impure graphite were in the yellow-brown sand. The corner-removed and straight-stemmed points were associated with the pavement and hearth. Stratigraphically their position is ambiguous.

Four sherds of coarse mineral-tempered pottery and three of vegetable-tempered pottery were found at this site by Mr. E. H. Cass while he was a student at Phillips Academy. Hofmann found no pottery in the 144 square feet which he excavated.

Camp Manning, Site 83

The site at Camp Manning, Boy Scouts of America, is located about 80 feet above the southern shore of Pomp's Pond on the extreme northern end of the sand plain which extends from Pomp's Pond to the south (Fig. 6). This site is fairly large, covering about ten acres, but has been pretty well ruined archaeologically. The southern portion has disappeared with the removal of sand and gravel. Extensive plowing, a railroad cut, the building of houses, and the activities of Boy Scouts have resulted in the finding and dispersal of many artifacts.

In 1943, the author found chips of quartz, the basal portion of a hafted knife, and part of a pavement near the lake shore in a locality suitable for a

canoe landing (Fig. 6, E). Excavation seemed unwise due to the small area available and the probability of damaging the land.

Mr. Hofmann is endeavoring to glean some information from this site. So far (1946) he has made fifteen tests, each 6 × 6 feet, spaced about 75 feet apart, in the western portion of the site (Fig. 6, from D northward). When the work is finished he is planning to publish the results. In the meanwhile he has very kindly made available to the author his field notes from which the following information has been taken.

The site profile consists, from top downward, of brown sandy loam, about 12 cm. thick, yellow-brown sand, 15 cm. thick, and the underlying mixture of sand and gravel. The latter becomes more coarse at greater depths. Very few sizable pebbles were found in either the loam or the yellow-brown sand.

Very few broken rocks were found in the yellow-brown sand. This may be significant, as such rocks were common at Foster's Cove at intermediate levels where pavements and quartz points were found. So far, Mr. Hofmann has found no pits, pavements, or hearths and only a weakly developed quartz industry.

Specimens from Camp Manning, all excavated by Mr. Hofmann, are illustrated in Plate VIII; the vertical distribution of projectile points is given in the tabulation below (Fig. 10). The following facts may be noted. Triangular points of dark felsite were found only in the loam. A small triangular point of quartz and various points with wide side notches were found in what may be referred to as an intermediate position in the upper portion of the yellow-brown sand. Corner-removed and straight-stemmed points of patinated felsite were found in the yellow-brown sand, concentrated near the bottom of this sand, at depths greater than that at which the side-notched points were concentrated.

In the lower portion of the loam were also found a small ovate knife of dark felsite, two fragments of scored soft graphite, and (near D, Fig. 6) sherds of coarse mineral-tempered pottery (Pl. VIII, 3-4). These sherds were also found in the very top portion of the yellow-brown sand at places where they were present in any sizable quantity in the loam. No other wares were found. Heavier implements, including those illustrated (Pl. VIII, 16-19), were found in the lower portion of the loam and the upper 6 cm. of yellow-brown sand. Also in the upper 6 cm. of yellow-brown sand were two long narrow knives (Pl. VIII, 9), the basal portion of a hafted knife, and an expanded-base drill. An asymmetric trianguloid knife was found at a depth of 23 cm.

The major difference between Camp Manning and Foster's Cove lies in the virtual absence of a quartz industry producing small triangular and small-

stemmed points. In this respect Camp Manning is similar to the Hofmann site. However, the one quartz triangular point was found in the same relative position as those at Foster's Cove, in the upper portion of the yellow-brown sand. Points with wide side notches are apparently much more numerous

		TRIANGULAR, DARK FELSITE	TRIANGULAR, SIDE NOTCHED, PAT. FELSITE	SMALL TRIANGULAR, QUARTZ	SIDE NOTCHED, CHERT	POINTS WITH WIDE NOTCHES AT SIDES, PATINATED FELSITE	ELONGATE SPEAR, WIDE NOTCHES AT SIDES, PATINATED FELSITE	STRAIGHT STEMMED POINTS		CORNER-REMOVED POINTS		CORNER-REMOVED SPEARS, PAT. FELSITE
								QTZ.	PAT. FELS.	PAT. FELS.	GRAY SLATE	
	PL. VIII	1,2		6	5	11	12	10	8	7,14	13	
DEPTH CM.	IN.											
LOAM	1											
	2											
	3										1	
	4	2	1									
	5											
YELLOW-BROWN SAND	6								1	1		
	7			1						3		
	8				2	3	2					1
	9						1			3	1	3
	10							1	2	2		1
	11										1	1

FIG. 10. Camp Manning: vertical distribution of projectile points.

at Camp Manning. It seems significant that they were found in the upper portion of the yellow-brown sand as were the few found at Foster's Cove and Camp Maud Eaton. As at these sites, the provenience of corner-removed

points was the deepest; triangular points of dark felsite were only found in the loam. The small quantity of the latter may be the result of previous collecting.

The total depth of culture-bearing deposit at Camp Manning is only about half that at Foster's Cove. The site is located on a practically level sand plain, a situation which is not conducive to stratigraphy. It is gratifying to note that Mr. Hofmann's work has produced further evidence of differences in form and material of artifacts corresponding to the relative depths at which they occur.

SITES ON THE UPPER SHAWSHEEN RIVER DRAINAGE

Included with sites on the upper drainage of the Shawsheen are those to the southwest of Pomp's Pond. Those near Foster's Pond (Fig. 1) will be discussed under a separate category. Near the shores of an artificial pond backed up by a dam that is about three-fourths of a mile above Pomp's Pond are sites 29, 31, 32 and 33. They are small sites where Mr. Hofmann found Indian material years ago. The survey was unable to find evidence of Indian occupation at these localities.

High Street, Site 30

A reject, part of a narrow spear point with wide side notches, and chips of quartz and patinated felsite were found in a garden some seventy feet above the Shawsheen River on the western edge of the sand plain which extends southward from Pomp's Pond. Test holes failed to find evidence of occupation underground. Hofmann found small triangular points of quartz here years ago.

Clemons, Site 84

A small, low dome-shaped, flat-topped sandy knoll, located beside a brook and spring, lies immediately to the southwest of a hill which rises 100 feet higher. The base of the knoll is about 15 feet above the water; its top is about 10 feet higher.

When this site was plowed a few years ago, chips and only a few artifacts were exposed. Independent tests by Hofmann and the author had similar results. Tests on top of the dome were sterile; those at the base uncovered a few chips in the plowed loam. Tests in the sloping sides, near the base, resulted in the finding of stone features, chips, and a few specimens.

The profile consisted of three layers: at the top was plowed sandy loam, about 20 cm. thick; below it was coarse yellow-brown sand containing a great many small pebbles; while at the bottom were the underlying light-colored

sands and gravel. The thickness of the yellow-brown sand varied between 20 and 60 cm., and this condition is apparently related in some manner to surface slope. Where the layer is very thick, the lower portion of this sand is light brown in color.

Three hearths and a pavement, all made of cobbles, were found in the upper portion of the yellow-brown sand. Of two hearths excavated by Mr. Hofmann, one was flat, round, 58 cm. in diameter, and contained some ash, charcoal, and chips. The other was shaped like a flat ring, 85 cm. in outside diameter, 25 cm. in inside diameter. The central portion contained burnt dirt and ash but did not contain rocks. A deposit of broken cobbles, measuring 47 × 65 cm., may have served as a hearth, as charcoal was found beneath the rocks. The pavement consisted of a layer of cobbles. Only a portion of this pavement, measuring 40 × 96 cm., was excavated.

Chips, predominately of patinated felsite but including a few of quartz, were concentrated in the upper portion of the yellow-brown sand. Specimens include a long, narrow knife, expanded-base drill, part of a corner-removed knife or spear point, and twelve fragments of worked stone. All were made of felsite and were moderately patinated. Except for one worked fragment which was found in the loam, they were found in the upper 10 cm. of yellow-brown sand.

Paucity of the inventory makes it impossible to reach conclusions, but it seems safe to say that the site is characterized by an absence of pottery, of dark felsite, of triangular points, and by a negligible use of quartz, as the total area dug represents a good sampling of the site.

Shawsheen Meadows, Site 27

A considerable area, including cultivated land and active sand dunes, has been included here as a site. Mr. Hofmann has found arrow points at various locations but the survey was unable to find any concentration of Indian material.

Burtt's Crossing, Site 51

Small tests on a sandy knoll, located on the sloping west bank of the Shawsheen River (Fig. 11) produced only a few chips of quartz and felsite in the top 10 cm. No further work was done here. This site is probably an extension of the Pringle site across the river (see below).

Pringle, Site 85

The Pringle site is located on a small plateau on the eastern side of the Shawsheen River, 19-23 feet above the river bed (Fig. 11). The surface slopes

downward from gravel ridges at the eastern and southern edges of this site. These ridges appear to be the southeastern limit of an esker system extending about a mile to the northwest. Apparently the Pringle site has been cut off from the main portion of the esker system by the Shawsheen River.

This site has been plowed for the past thirty years by the owner, Mr. Henry F. Pringle, who said that formerly collectors would come and follow the plow every spring and fall. A large number of artifacts are reported to have been found. On a map of Tewksbury, published in 1875, the words "Once an Indian Camp" appear at the location of the Pringle site.[26]

Tests at the Pringle site consisted of a major test (Test I), covering 250 square feet, and several small tests located as shown on the map (Fig. 11). Profiles from the main test are also shown in Figure 11.

The plowed sandy loam of Test I contained a few pebbles, up to 15 cm. in diameter. The underlying yellow-brown sand included a zone, 5-15 cm. below the base of the loam, containing pebbles, cobbles, and broken rocks. Usually these rocks were scattered irregularly as shown in Profile A (Fig. 11). In two places, cobbles and small boulders, but no broken rocks, formed a fairly solid layer as shown in Profile B (Fig. 11). These stones did not appear to have been purposely laid, as in a pavement, but to have a random arrangement. In the latter case, where the rocks formed a layer (Fig. 11, B), chips were found above and below but not among them. When the rocks were only scattered (Fig. 11, A) chips were found above, among, and below them.

Five pits were found. Two of these, full of charcoal, had been dug from a surface within the loam. One was small, measuring 30 × 54 × 4 cm., and surrounded by sand reddened by heat. The other, much larger, is shown in one of the profiles (Fig. 11, C). The "loam" around this pit was composed almost entirely of charcoal. Like the rest of the plowed loam, it contained fragments of brick, glass, nails, and crockery, but none of this material was found in the pit below the base of the plowed zone. Charcoal in the pit included some from pine branches up to 7 cm. in diameter. None showed marks of a metal ax. Also in the pit were seven chunks or large flakes of quartz and varying amounts of unstratified dark brown sand. At the bottom of the deposit was a mass of charred bark.

The top of another pit, the mouth of which measured 33 × 50 cm., was found 7.5 cm. below the base of the loam at the same level as the scattered rocks mentioned earlier. This pit measured 12.5 cm. vertically and contained dark brown sand, two chips of felsite, and some broken rocks.

Lower portions of two other pits were found at a depth of 38 cm., well

[26] County atlas of Middlesex, Anonymous, 1875, p. 32*a*.

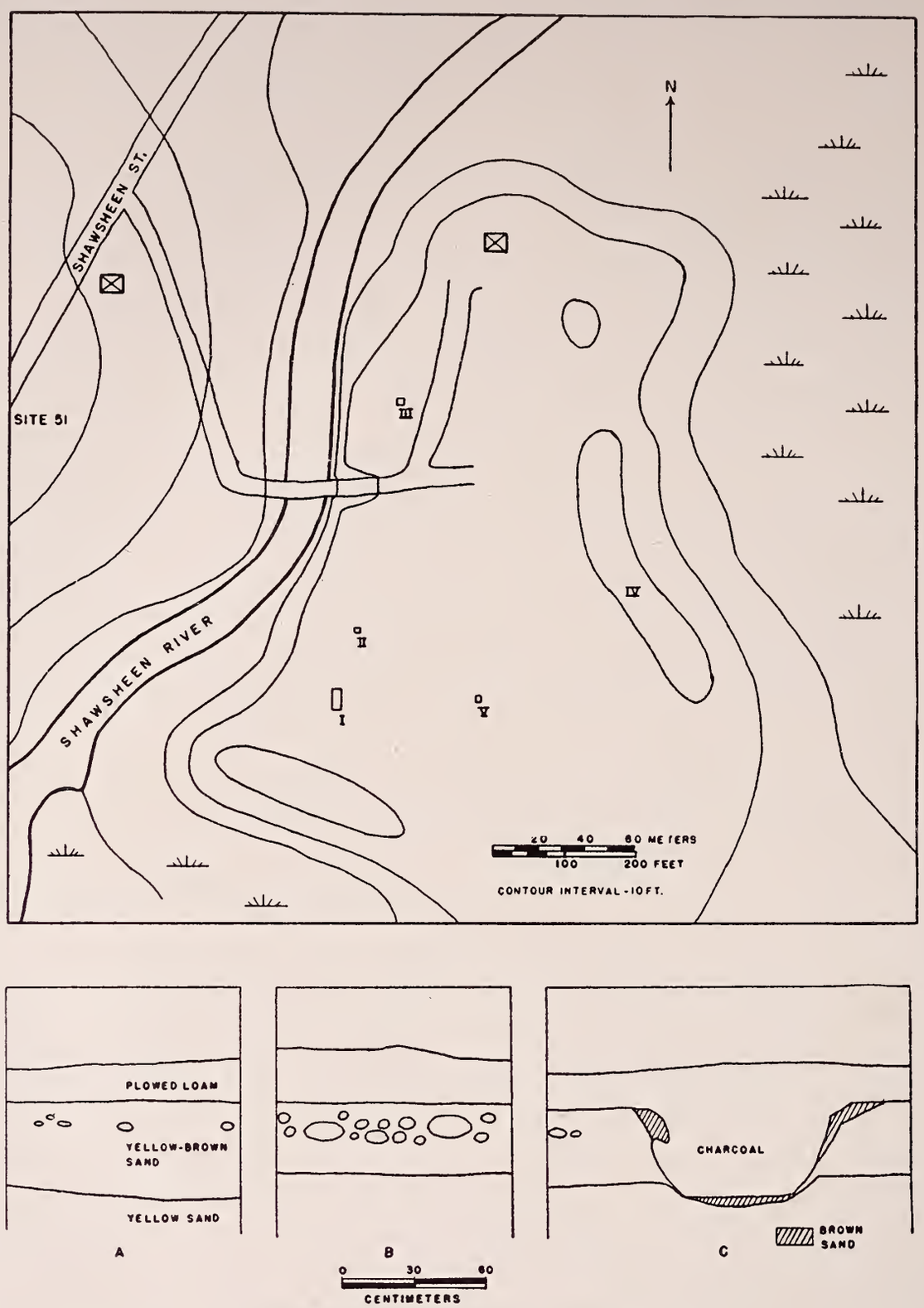

FIG. 11. The Pringle Site: map to show location of tests I to IV; A-C, profiles from Test I. Map after Wilmington sheet, U.S.G.S., 7½-minute series.

below the zone of scattered rocks. Presumably the tops of these pits originally were higher, as their greatest vertical measurement was only 9 cm. One contained dark brown sand and charcoal, the other, alternate layers of dark and light sand, apparently deposited by water.

Specimens from the major test at the Pringle site are illustrated in Plate IX. In the plowed loam were found two triangular points (Pl. IX, 1), one point with narrow side notches (Pl. IX, 2), two worked fragments, all of dark felsite, scored soft graphite (Pl. IX, 3), and one hundred six sherds. Of the sherds, ninety-four were from coarse mineral-tempered wares, eighty-seven were undecorated (Pl. IX, 4), six were decorated with imprints of cord- or textile-wrapped paddles, and one, with an impressed row of parallel marks. The individual marks measured .7 × 1.5 mm. On one edge of the last sherd was half of a drilled hole. One of the six decorated sherds showed the simple rounded rim typical of these wares. The balance of twelve sherds included ten with vegetable tempering, one of which bore rows of "fingernail" marks, and two with fine mineral temper, one of which exhibited a textile imprint.

In the upper 5 cm. of underlying yellow-brown sand were twenty-four sherds, all coarse mineral-tempered and half with the customary paddled decoration (Pl. IX, 5).

In the yellow-brown sand were four small triangular points, three of quartz (Pl. IX, 7) and one of rhyolite (Pl. IX, 9); ten small-stemmed points (Pl. IX, 6, 8, 12-13) all of quartz; one straight-stemmed and six corner-removed (Pl. IX, 10-11) points of patinated felsite or micaceous quartzite, and two corner-removed spear points of felsite (Pl. IX, 15) or gray slate (Pl. IX, 16). An elongate knife of gray slate (Pl. IX, 17), an asymmetric trianguloid knife of felsite (Pl. IX, 18), and a "beach pebble" hammerstone (Pl. IX, 19) were also found in the yellow-brown sand, more than 12 cm. below the base of the loam.

At this test, there was an association in the ground between the deepest pottery and the uppermost quartz points. At greater depths, quartz points and corner-removed points were associated. It should be clearly understood that at depths at which the latter forms were found there was no pottery and so there was no association between pottery and corner-removed points. The quartz points were found in the upper 12 cm. of yellow-brown sand, including the zone of scattered rocks, as at Foster's Cove. Corner-removed points were found in this same zone but were also found at greater depths. The straight-stemmed point and two of the corner-removed points were below the scattered rocks.

Several small tests were also made at the Pringle site (Fig. 11, Tests II-V).

At Test II, chips of dark felsite were found in the loam, chips of quartz and patinated felsite, in the yellow-brown sand. At Test V, sherds of coarse mineral-tempered pottery and chips of dark felsite were in the loam, chips of quartz, in the yellow-brown sand.

In Test III, where the surface was four feet lower than at Test I, the thickness of the plowed loam, which measured 23 cm. was relatively great. In the plowed loam were a few pebbles and cobbles up to 12.5 cm. in diameter. The underlying yellow-brown sand was only about 8 cm. thick. As in Test I, it contained broken rocks and cobbles. Beneath this sand was a zone about 15 cm. thick, containing a very great many pebbles 2.5 cm. in diameter, and resting upon yellow sand.

In this test, six sherds of coarse mineral-tempered pottery and chips of dark and patinated felsite were found in the plowed loam, chips of quartz, patinated felsite, and gray slate, in the yellow-brown sand.

At Test IV the loam was very thin, measuring 12.5 cm. including the sod, and rested directly on compact gravel. A gouge (Pl. IX, 20) was found in the thin loam. Unfortunately, no chips, sherds, or other evidence of occupation was found with this gouge.

These supplementary tests indicate that stratigraphic relationships found in Test I are, in all probability, characteristic of the rest of the site. They also suggest that slope wash from the now nearly bare gravel ridges to the east and south was the major agency responsible for the burial of cultural remains.

The Pringle site is three and a half miles south of Foster's Cove. The same two major groups of cultural remains were found—an earlier one, represented by corner-removed and small triangular and small-stemmed points, occurring in yellow-brown sand; and a later one, represented by pottery, large triangular points, and points with narrow side notches, all found in the loam. As at Camp Maud Eaton, coarse mineral-tempered was the deepest, and hence the earliest ceramic type.

Close association of corner-removed points and those of quartz at the Pringle site furnishes more evidence than was found at Foster's Cove in support of the contention that the earlier period was a period of transition. The corner-removed points from the Pringle site are heavy and massive, resembling more closely those from the Hofmann site than those from Foster's Cove.

O'Neal, Site 86

In a small amphitheater, about 150 feet across, enclosed on three sides by parts of an esker and on the fourth by a small kettle-hole, evidence of occupa-

tion is to be found in the form of chips lying on the present surface of exposed sand. Other chips were found at a depth of 15 cm. at the base of this sand and on top of underlying yellow-brown sand and gravel. No chips were found in the intervening zone. The sand between these zones of chips appears reworked, possibly by wind.

Garland-Gale, Site 89

At a slight rise of ground at the southeastern shore of Round Pond, chips were found on the surface, which appears eroded; none were found underground. A short distance to the west, at Garland's Greenhouse, plummets and stemmed points, but no chips, have been found.

Lacy, Site 73

This site extends about a half mile along the north side of Heath Brook. Although most of the site is included in the Old Heath Brook Farm owned by Mr. J. Robert Lacy, it extends farther to include parts of the next farms.

While the ground is by no means level, it forms, in general, an irregularly shaped sloping plateau, extending towards the southeast from higher ground. Along the brook, the edge of this plateau is formed by a bank which is fairly steep and about ten feet high. Near the western and eastern ends of the site, erosive processes are actively at work. The middle portion is in pasture and cultivated land. To the northwest is a small ridge, higher than the rest of the plateau. This ridge separates the western eroded area from the balance of the site. To the south, two small knolls, separated from the plateau by a narrow swale, rise a little higher than the swamp bordering the brook.

In test holes near the eroded areas and at various points on the plateau, a few chips of quartz and patinated felsite were found in the plowed loam and in underlying yellow-brown sand, but no heavy concentrations were discovered. More chips were found in the upper portion of yellow-brown sand than elsewhere.

At the eastern knoll, between the swamp and the plateau, the profile consisted of sandy loam, reddish yellow-brown sand, and underlying light colored sand. Both the loam and yellow-brown sand contained pebbles, 2.5 cm. in diameter. In three tests, quartz chips were found only in the upper portion of the yellow-brown sand. In one of these tests, a pit about 100 cm. square, thirty chips of a reddish porphyritic rock were in the loam; nine similar chips plus eight of quartz were found in the upper 10 cm. of yellow-brown sand. Consistent evidence of a quartz industry in the upper portion of the yellow-brown sand, as at Foster's Cove, should be noted.

At the western knoll, a test excavation, measuring 1.5 × 4.5 meters, was made. From the surface down, the exposed strata consisted of plowed loam, 15 cm. thick; yellow-brown sand, 25 cm. thick; and underlying light yellow or white sand. The lower half of the yellow-brown sand contained many small pebbles. In the upper portion of the yellow-brown sand, a layer of pebbles and cobbles extended over the whole northeastern half of this trench, except for a small pit. This deposit may have represented a pavement but did not seem formalized enough to be so designated. In this half of the trench, chips of a red porphyritic rock were found in the loam and in the yellow-brown sand, occurring above, among, and below the layer of rocks. The top of the pit referred to above, 25 cm. in diameter and 10 cm. in vertical measurement, was found in yellow-brown sand, 10 cm. below the base of the loam, near the bottom of the rocks. As no rocks were above it, this pit appears to have been dug through the layer of pebbles and cobbles. It contained charcoal, red porphyritic chips, and some broken rocks.

In the southwestern half of the test trench the situation was radically different. No layer of rocks was found. A few red porphyritic chips, one of quartz, and three of patinated felsite were in the loam, but the chips in the yellow-brown sand were of gray slate (72) or quartz (12). The depth at which those of quartz occurred varied, but those of gray slate were concentrated at a depth of 16 cm. below the base of the loam. With them was found a corner-removed spear point. The chips distributed in this way may be debris from superimposed workshops. The distribution of material is reminiscent of Foster's Cove.

These tests have been mentioned to indicate that at this site, evidence of human occupation was present in the soil to some depth. This is pertinent because collectors report that the predominant type of projectile point now being found at this site is different from that reported to have been found years ago.

Dr. Ernest E. Tyzzer of Wakefield, Massachusetts, and Mrs. J. Robert Lacy, who lives at the farm, have surface collections from this site made within the past ten years. A combined inventory of these collections is given below. Dr. Tyzzer kindly classified his collection; the author classified that of Mrs. Lacy.

Projectile Points	
Large triangular	8
Small triangular	50
Trianguloid with wide side notches	19
Elongate with wide side notches	18

Small-stemmed		27
Straight-stemmed		6
Corner-removed (including spears)		160
	Total	288
Knives		
Asymmetric trianguloid		18
Ovate		12
Elongate or lanceolate		8
Drills		
Expanded-base		18

The large triangular points are made of moderately patinated felsite. About half of the small triangular and small-stemmed points are of quartz. The corner-removed points are predominantly of heavily patinated felsite or gray slate.

Heavier artifacts include five plummets, two notched pebbles, one grooved pebble, two gouges, a small gouge (5.5 cm.), a celt, a small celt (5 cm.), pestle, hammerstones, scored soft graphite, impure graphite, and two drilled pebbles or pendants. Mrs. Lacy has also a portion of a copper spear (Pl. X, 2). One side is beveled and the other nearly flat.

It is evident from the above that over half the projectile points (55%) are of the corner-removed type. Mr. Lacy, who worked on this farm years ago, insists that when he was young only triangular points of a dark stone were found. He says it has been only recently, since they have been plowing deeper than formerly, that they have found points made of quartz or corner-removed points of light-colored stone.

This evidence all fits the hypothesis that the Lacy site originally contained the same sequence of forms and materials as was found at Foster's Cove. If this were formerly the case, the high percentage of corner-removed points now being found must be due to the erosion of the upper layers and the collection and removal of characteristic artifacts as well as to the deeper plowing of recent years.

No pottery is known to have been found on the central and eastern parts of the Lacy site. In a very restricted portion of the eroded western area, Dr. Tyzzer found sherds from a vessel having nodes and a Mohawk-like collar (Pl. X, 1). The ground in which these sherds were found is blackish-brown and contains much charcoal and loam. The surrounding area consists entirely of eroded sand without charcoal or heavy admixture of loam. Dr. Tyzzer found sherds only in the blackish-brown dirt which covers an area about eight feet in diameter. Points from the surrounding sand are chiefly

small triangular and small-stemmed points of quartz. Corner-removed points are relatively rare (25%). One large lanceolate point, similar to those found with collared pottery at Camp Maud Eaton, has been found in this part of the site.

It would seem a mistake to consider that the pottery found in the loam and charcoal was associated with the chips and points from the sand. The alternative hypothesis, that these sherds came from the basal portion of a large pit, appeals to the author as a more likely one.

Carter's West Field, Site 113

About a half mile to the west of the Lacy site in the same field with small triangular and small-stemmed points of quartz, two side-notched points of felsite, and an ovate knife, Dr. Tyzzer found two sherds of coarse mineral-tempered pottery, one having a "sandy" surface. The association of pottery of this type with these classes of artifacts, admittedly from the surface of a plowed field, approximates the association of forms observed in the upper portion of the yellow-brown sand at Camp Maud Eaton, Test VI.

Pine Ridge Cemetery, Site 88

The eastern part of this site is a large active sand dune upon which chips were found. Chips were also found on the surface of small sand blows to the west. Between, where the land slopes downward to Heath Brook, were holes made by "pot-hunters."

Between the sand blows and the brook, test holes uncovered chips of quartz and felsite; coarse mineral-tempered sherds, some plain, some impressed by cord- or textile-wrapped paddles; and the basal portion of a point having wide side notches. These were in the lower part of the loam and the very upper part of underlying yellow-brown sand, as at Foster's Cove and Camp Maud Eaton, Test VI. The association of this pottery with a point having wide side notches should be noted.

Buss, Site 87

Apparently Indians camped along a mile-long stretch of the shore of the Shawsheen River and Content Brook, on the estate of Mr. W. H. Buss, but did not stay in one place long enough for concentrations of material to accumulate. Chips were found on the surface of sand blows and at certain spots where they had been exposed by erosion. Tests produced a few chips of quartz and patinated felsite in the river terrace at a depth of 30 cm., 10 cm. below the

base of the loam. This depth is comparable to that at which these materials occur in other sites.

Content Brook, Site 99

A few chips found on a low plowed field beside Content Brook constitute the only evidence of occupation at this site.

Jones Brook, Site 114

In a large sand blow on the south shore of Jones Brook, chips of quartz and gray slate were found on the eroded surface.

Crosby, Site 66

This site is in a large sandy field about fifty feet above Vine Brook. Only a few chips were found in the plowed loam of several test holes.

SITES NEAR FOSTER'S POND

Ballardvale Road, Site 28

Here, in a low, tree-covered field which used to be cultivated land, beside a small brook, test pits uncovered only one or two chips. Hofmann found arrowpoints and chips at this location years ago.

Stickney, Site 77

The Stickney site[27] is located on a small sandy knoll or kame beside a brook flowing into the Shawsheen River. It was possible to distinguish three layers: the uppermost consisted of brown sandy loam, about 12.5 cm. thick; beneath it was yellow-brown sand which in two tested places was 18 and 40 cm. thick, respectively, and which contained some pebbles; underlying the latter layer were light colored sands and gravels.

Five pits were found; they measured 30-50 cm. across and 20-45 cm. vertically. The contents of one, Pit 3, was divided into an upper and lower part by a layer of yellow-brown sand. In the lower brown sand of this pit was a fragment of a projectile point.

This site had been cultivated, probably from 1815 to 1845,[28] and Indian material was mixed with glazed pottery in the loam. Only two classifiable specimens were found in the underlying yellow-brown sand, a typical corner-re-

[27] Bullen and Hofmann, 1944*a*.
[28] Bullen and Bullen, 1945.

moved point and a flake knife. The balance of the inventory, found in the loam or at the division between the loam and the yellow-brown sand, included two small triangular points of quartz; a blunted spear point or knife with wide side notches; a straight stemmed point; two corner-removed points for arrows and four corner-removed points for spears; one knob-ended, and three expanded-base drills, all of patinated felsite, gray slate or micaceous quartzite; and a fragment of impure graphite.[29] Chips, in order of their frequency, were of patinated felsite, gray slate, quartzite, and quartz.

This inventory agrees with that from the yellow-brown sand at Foster's Cove. It should be noted that not a sherd of Indian pottery, no large triangular point of felsite, nor any amount of dark felsite chips were found. The excavated area covered 1300 square feet, much more than the site warranted, and the failure to find sherds and large triangular points is not attributable to sampling. Nor can it be ascribed entirely to the effects of cultivation, as pottery was found at the Pringle site which had been plowed for at least thirty years. The cultural remains found in the loam of the Hofmann, Foster's Cove, Maud Eaton, and Pringle sites were apparently never present at the Stickney site.

Gray patinated felsite was prevalent in the loam of the Stickney site. At other sites, previously mentioned, dark felsite was in the loam and gray patinated felsite in the underlying yellow-brown sand. Differences in the surface color of artifacts made from this material must be due to differences in the nature of the material or to differences in the amount of time which had elapsed since the surfaces were flaked, or to both, but not merely to the depth or character of the deposit in which such artifacts were found.

Foster's Pond, Site 78

On the north shore of the outlet of Foster's Pond is a sandy region abounding in small hills and valleys. In certain locations, chips are found after heavy rains. About 100 feet from such a location Hofmann excavated thirteen corner-removed spear points in an area measuring 1.8×4.5 meters.[30] Except for these artifacts and sixteen small chips, he found nothing else in the entire area which was excavated, some 4.5×4.8 meters in extent.

The specimens are all of patinated felsite and were found at a depth of about 20 cm., at the base of brown sand underlaid by yellow sand. These points are similar to the specialized spear points found at the Hofmann site

[29] Bullen and Hofmann, 1944*a*, Fig. 6, p. 23.
[30] Hofmann, 1943.

(Pl. II, Nos. 16-17) but are not so well made. Three, if finished, are markedly asymmetric.

Goldsmith, No. 1 and 2, Sites 92 and 100

A few chips were found on small peninsulas jutting into Foster's Pond. To call these places sites is to dignify them unduly.

Richardson, Site 93

Chips, exposed by erosion or by excavations for cellars were found at various places on a fairly level sandy plateau about twenty-feet above the northwest shore of Martin's Pond. Test holes failed to uncover evidence of any concentration. Artifacts have been found by children and collectors.

Hill's Steatite Quarry, Site 67

There is a steatite quarry located on the Skug River. There is no evidence that this quarry was ever used by Indians. Hand samples collected by J. H. Sears at this site and now in the Peabody Museum, Salem, Massachusetts, are catalogued as from "Flint's Soapstone Quarry."

Hill, Site 68

This site, located on a fairly level sand and gravel plain, about eighteen feet above the Skug River, had disappeared with removal of sand and gravel. Only a few chips could be found near the periphery of the gravel pit. All test holes were sterile. Mr. Paul Hill, who lived at the site in 1946, had a collection from it which consisted of small triangular points of quartz and felsite, corner-removed points of patinated felsite, a gouge, and fragments of two bannerstones. It should be noted that these are the only bannerstones reported for the area. Unfortunately they are not excavated specimens. Part of a human skeleton was found when a steam shovel operated there.

SITES NEAR MARTIN'S BROOK

Martin's Brook, the outlet of Martin's Pond, makes a wide westward bend before flowing east to join the Ipswich River. Figure 12 is a map of this region showing the location of eight Indian sites, all in an area a half mile square, within the bend of the brook. Of these sites, two were partially excavated and four tested. Sites were not found on the opposite side of Martin's Brook where the ground is more rocky.

State Sanitarium, Sites 44, 103, 112

There are three sites on the grounds of the North Reading State Sanitarium which occupies most of the flat-topped ridge near the center of the bend of Martin's Brook (Fig. 12). These sites, all plowed fields, have been hunted by collectors for many years.

Mr. Leary, who has charge of the Sanitarium grounds and gardens, showed the author several large straight-sided triangular points of dark felsite, small triangular and small-stemmed points of quartz, and corner-removed points of patinated felsite. In reply to questions, he said that large triangular points of

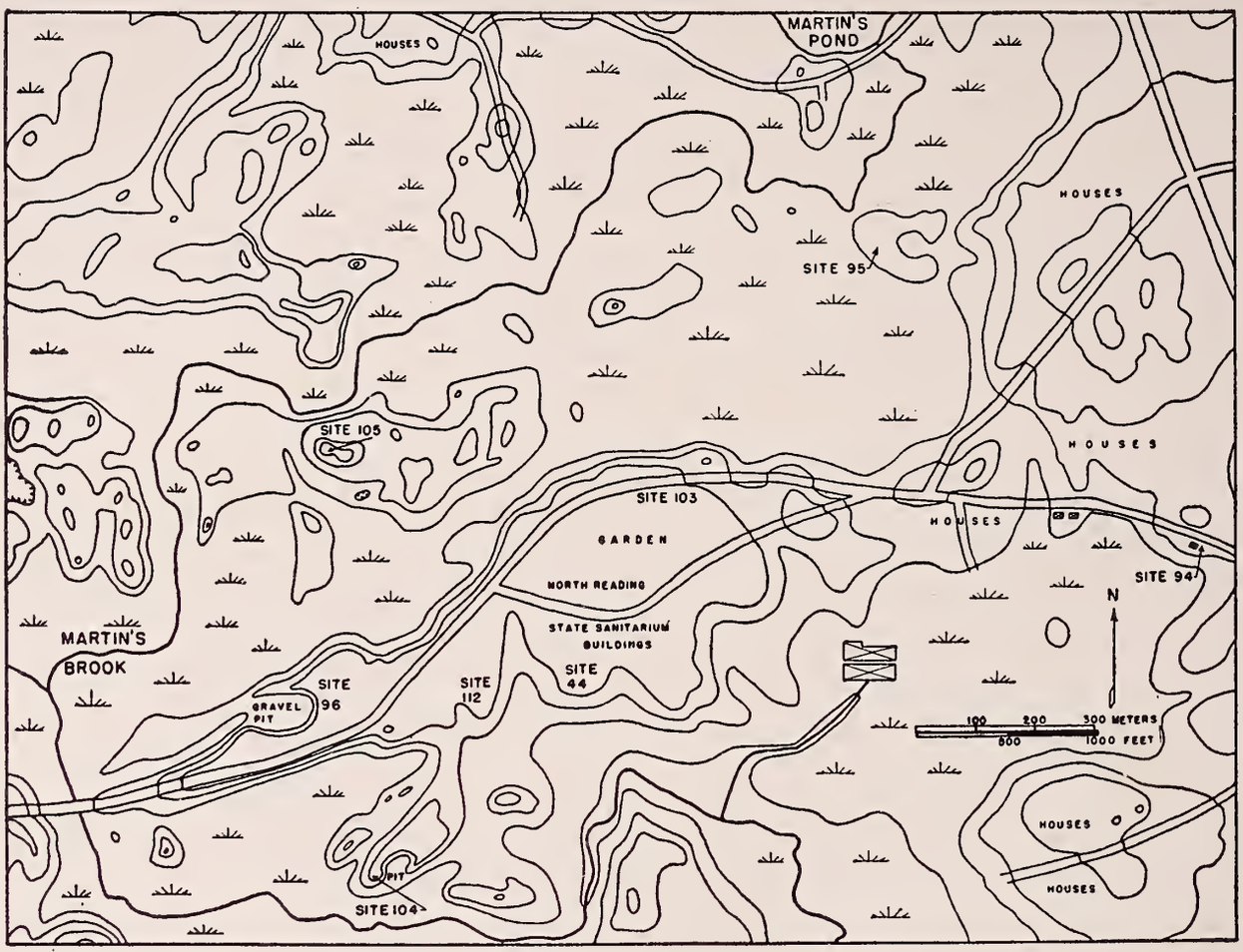

Fig. 12. A map of the area around Martin's Brook, showing the location of Indian sites. Contour interval: ten feet. (After U.S.G.S., Wilmington and Reading Sheets, 7½-minute series.)

dark felsite came from Site 103. His impression was that most of the quartz points came from Site 44 and that most of the corner-removed points came from Site 112. The latter two sites were in hay and not available for testing at the time of the survey.

Several test holes were made at Site 103. The profile consisted of sandy loam, yellow-brown sand containing a few pebbles, and an underlying deposit of sand and gravel. Chips of dark felsite and a fragment of what appears to be a large knife, of the same material, were found in the loam. No sherds were found. The yellow-brown sand was sterile.

It will be noted that, as at Foster's Cove, dark felsite was limited to the loam.

Flint's Field, Site 95

This site (Fig. 12) is on a low doughnut-shaped area of land on the farm of Mr. A. Flint, North Reading. The elevation of the site is only about ten feet above the swamp. Tests indicated that below a plowed zone there was yellow-brown sand and gravel resting on light colored sand and gravel.

Chips of quartz and patinated felsite were found in the plowed zone and in the upper 12 cm. of yellow-brown sand and gravel. Surface collecting produced small triangular, small-stemmed, and corner-removed points of quartz and patinated felsite. An asymmetric trianguloid knife of felsite, a quartz scraper, and a fragment of pecked stone were also found. This association is representative of the lower zones of Foster's Cove. Neither pottery, nor chips or specimens of dark felsite were found.

Chips were also found in the ground on the two larger "islands" to the northwest of Site 95 (Fig. 12). The elevation of these "islands," as well as that of the "doughnut," relative to nearby water, is substantially less than that of most sites previously mentioned.

Flint's Woods, Site 105

Flint's Woods (Fig. 12) is located on a small kidney-shaped knoll rising about twenty-five feet above the surrounding lower land which separates it from the swamp. Trenches, each measuring about 3×7.5 meters, were excavated in both the western and eastern portions of the site. The surface of the eastern area was about two feet higher than that of the western area.

The profile, from the surface downward, consisted of sandy loam, 12.5-17.5 cm. thick; yellow-brown sand, 25-43 cm. thick; and coarse sand and gravel. The sand of the upper two deposits was extremely fine, almost powdery, and contained some pebbles up to 6 cm. in diameter. Pebbles were fewer in number and larger in size to the east than to the west. Loam to the west was red-brown, that to the east, brown in color. Coarse sand and gravel to the west was light yellow; that to the east was reddish in color. Over part of the eastern area the yellow-brown sand was separated from the coarse sand

and gravel by layers of red sand and pebbles and white sand, 10 and 5 cm. thick respectively. These latter deposits were sterile, as was the coarse sand and gravel.

Possibly the western, certainly the eastern, area had been plowed many years ago. This plowing does not seem to have affected the site archaeologically. No pits, pavements, hearths, or other features were found. As no stratigraphy was present and there seemed to be no significant difference, archaeologically, between these two areas they will be considered as one.

A vast number of chips of heavily patinated felsite, an insignificant number of chips of quartz, thirty-six for both trenches, and a few gray slate chips were found in the lower portion of the loam and in the upper portion of the yellow-brown sand. In certain areas these chips were found down to the coarse sand and gravel at a depth of 50 cm. but the concentration was near the top of the yellow-brown sand at a depth of about 25 cm.

Specimens from Flint's Woods, illustrated in Plate XI, were found in a narrow zone comprising the lowest 5 cm. of loam and the upper 10 cm. of yellow-brown sand. The relative scarcity of projectile points and large number of knives, in comparison with other sites, is evident. Fragmentary specimens, possibly from projectile points, do not indicate any substantially higher proportion of projectile points than is given in Plate XI.

The complete classifiable inventory includes three corner-removed points of gray slate and quartz (Pl. XI, 1, 2), two thumb-nail scrapers of quartz (Pl. XI, 3), one expanded-base drill with notched sides (Pl. XI, 4), two long narrow knives (Pl. XI, 6, 10), six asymmetric trianguloid knives (Pl. XI, 5, 7-9), a trapezoidal knife, and a fragment with a chipped edge which may possibly have been polished by use. Except as indicated above, these are made of gray felsite, either heavily or moderately patinated. One of the knives (Pl. XI, 7) has ears for hafting.

Lack of any triangular points[31] or small-stemmed points suggests that Flint's Woods represents a culture approximately equal to that found in the lowest levels at Foster's Cove. The relatively large number of knives reflects local food gathering requirements. A similarly large proportion of knives will be noticed in the inventory from the nearby Van Steensburg site.

[31] Two of the asymmetric trianguloid knives (Pl. XI, 7, 8) might be considered projectile points. A comparison with Pls. II, III, and VII will indicate the author's reason for not so considering them.

Van Steensburg, Site 96

The Van Steensburg site is located about thirty-five feet above the swamp, on the westward extension of the large hill forming the center of the bend of Martin's Brook (Fig. 12). Part of the site has disappeared with the removal of sand and gravel. Loam has been stripped from the southern portion of the remainder of the site, exposing red-brown sand containing chips.

A north-south trench, 25.5 meters long and from 1.5 to 4.5 meters wide, covering some 73.2 square meters, was excavated in the northern undisturbed portion of the site. This trench connected two concentrations of chips or

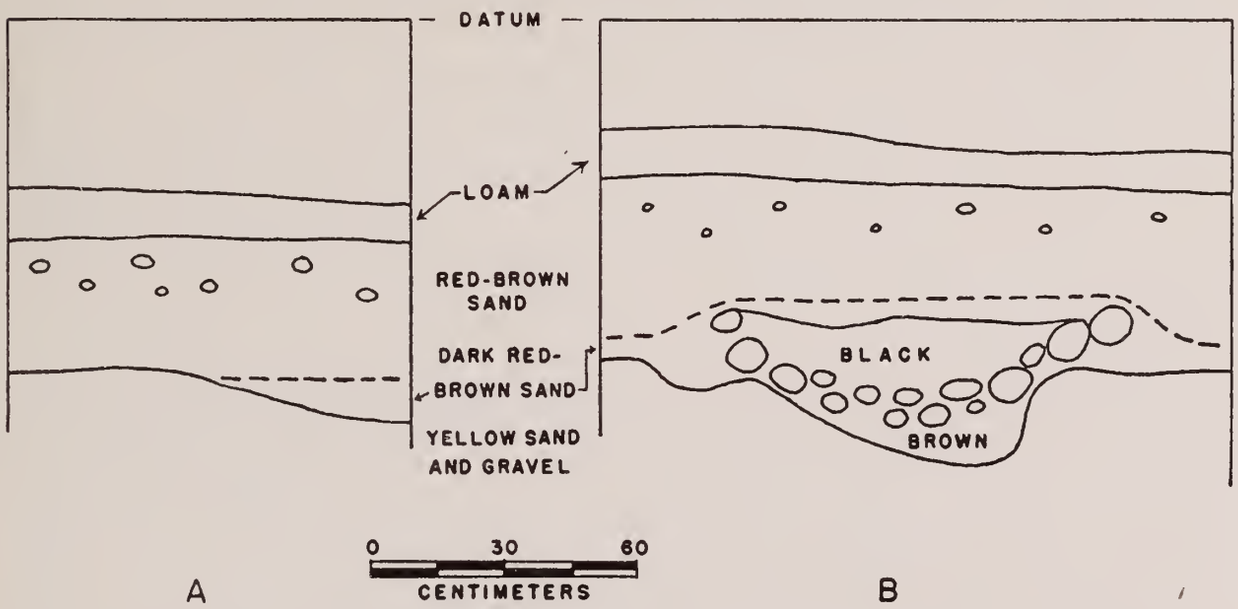

FIG. 13. Van Steensburg site: *A*, section across the trench; *B*, cross section of Hearth 1.

workshop areas. A greater area was excavated to the north, than to the south, due to the greater number of features and implements found there. Features included two hearths and eight pits. All but three of the pits were to the north. These three pits were in the narrow middle part of the trench where the frequency of implements was low.

The site profile (Fig. 13) was composed of sandy loam, 10-15 cm. thick, red-brown sand, 21-45 cm. thick, and underlying yellow sand and gravel. The loam consisted chiefly of coarse dark brown sand containing many pebbles up to 5 cm. in diameter. The red-brown sand could be divided into two zones: an upper part of coarse sand, containing a great many pebbles, many cobblestones, and some broken rocks, and a lower part characterized by fewer and smaller stones. Over part of the excavation, a third zone was found near the base of the red-brown sand. This zone was dark brown in color as the

result of heavy impregnation with limonitic compounds. It was found principally to the north where the red-brown sand was thickest, and in various depressions or pockets in the irregular surface of the yellow sand and gravel (Fig. 13. *A*). These pockets did not appear to have been dug by man.

Concentration of limonitic material at the base of the red-brown sand is due to deposition of iron salts by water percolating through the coarse sand, and is a phenomenon associated with the formation of the soil profile here. That it occurred after the abandonment of the site by Indians is evident by the fact that a limonitic layer had formed over the hearths (Fig. 13, *B*).

The eight pits varied in size from 23 × 23 × 7.5 cm. to 45 × 60 × 25 cm. In no case could they be traced above a depth of 27 cm., or 12.5 cm. below the base of the loam. This depth is about equivalent to the bottom of the upper zone of the red-brown sand. Contents included brown dirt, charcoal, felsite chips, and occasionally calcined bone. One pit was near the center of what may have been a larger pit, 100 cm. in diameter, scooped out of the yellow sand and gravel.

A section of Hearth 1 is given in Figure 13 and a picture of Hearth 2 in Plate XII. Both hearths were saucer-shaped, with a concavity of about 15 cm., and were built of granite cobbles, 10-20 cm. in greatest dimension. There was a tendency for the larger stones to be near the periphery of Hearth 1 but the converse was true of Hearth 2. Hearth 1 was formed by two courses of rocks, on or in brown dirt which partly filled a depression or hole made in the yellow sand and gravel (Fig. 13, *B*). Hearth 2 (Pl. XII) was made with only one course of rocks placed in a shallow depression scooped out of the yellow sand and gravel. Tops of rim stones of both hearths were 38-45 cm. below the surface. No evidence of a pit could be found higher. Chips were abundant in the red-brown sand above both hearths and some were in the black dirt and charcoal of Hearth 2.

Specimens from the Van Steensburg site are illustrated in Plate XIII. The collection from this site does not include pottery or large triangular points similar to those found at other sites. The relative abundance of asymmetric trianguloid knives is evident. While no stratigraphy was found, certain suggestions of cultural change are in agreement with data previously presented from other sites.

Few chips were found in the loam. In certain areas, chips were concentrated in the upper red-brown sand; in others, more chips were found in the lower part of this sand. The vertical distribution of these chips agrees roughly with

the evidence from pits in defining the occupational zone as relatively deep and therefor not recent.

Only three complete specimens (Pl. XIII, nos. 15-17) were found in the loam.[32] In the north end of the trench, four small triangular points (Pl. XIII, 1-3), one elongate point with wide side notches (Pl. XIII, 7), and one corner-removed point (Pl. XIII, 8) were found in the upper portion of the red-brown sand. In the lower part of this sand was one point with wide side notches and a rubbed base[33] (Pl. XIII, 5) and two corner-removed points (Pl. XIII, 9). The small triangular points were about ten feet horizontally from the corner-removed points but it seems evident that in this end of the trench the depth at which the latter points were found was, on the average, greater.

In the middle portion of the trench, were two points with wide side notches (Pl. XIII, 4), one in the upper and one, with a rubbed base, in the lower portion of the red-brown sand. A corner-removed spear point (Pl. XIII, 10) was also found in the lower portion of the red-brown sand.

In the southern end of the trench, two small triangular points and two elongate points with wide side notches were found, one of each in the upper and lower zones of the red-brown sand.

As at Foster's Cove, quartz was concentrated in the upper zone of the red-brown sand. Of sixteen worked items of quartz, thirteen, or 80%, were in the upper 10 cm. of red-brown sand compared with only 53% of pieces of worked felsite found in the same zone. In every square of the northern part of the trench, the ratio of quartz to felsite chips was greater in the upper than in the lower portion of the red-brown sand.

In addition to the sixteen projectile points discussed above, excavation produced two quartz hammerstones, a quartz cleaver or chopper (Pl. XIII, 12), a fragment of impure graphite (Pl. XIII, 11), an expanded-base drill (Pl. XIII, 13), fourteen asymmetric trianguloid knives (Pl. XIII, 14-21), five ovate knives (Pl. XIII, 22), a large scraper (Pl. XIII, 23), and a pestle (Pl. XIII, 24).

The large scraper is similar to the one from the lowest zone at Foster's

[32] These three specimens might be classified as large triangular arrow points or as especially well made trianguloid knives. As triangular points of this size from other sites are equilateral or isosceles with concave sides (Pl. III, 1-3), the author considers these specimens from the Van Steensburg site to be knives. These specimens, as well as similar ones from Flint's Woods, do not have rubbed bases as is reported for similar specimens found in the Laurentian of eastern New York State.

[33] Except for two points in the collection of Mr. Carter from his farm on Heath Brook (just west of Lacy's) two points from the Van Steensburg site with wide side notches were the only ones found that have rubbed bases.

Cove (Pl. V, 10). The pestle was found at a depth of 40 cm., or 25 cm. below the base of the loam, in the lower zone of the red-brown sand, 5 cm. above the yellow sand and gravel. It was 10 cm. south and 12.5 cm. higher than the stones forming the southern rim of Hearth 2. This pestle does not appear to have been associated with Hearth 2, but rather to have arrived "in situ" as one result of a leveling process after the abandonment of the hearth.

The relatively large number of knives at the Van Steensburg site and at Flint's Woods presents a problem in interpretation. The physical environment suggests a correlation with swamp land or a small brook draining a lake. These sites may have been fishing stations occupied during the annual run of fish up Martin's Brook. Fish also spawned in the upper reaches of the Shawsheen River,[34] but in collections from sites in the latter area, knives do not represent such a large percentage of stone artifacts.

Van's Sand Pit, Site 104

Chips were found on both sides of this sand and gravel pit (Fig. 12). Test holes on the west side produced some chips of felsite and one or two quartz chips at depths of 10-23 cm. below the surface. It was evident that the site had disappeared with the removal of sand and gravel.

Smith, Site 94

The Smith site (Fig. 12) is located at the home of Mr. Frank Smith, Lowell Street, North Reading. Part of the land is higher than Lowell Street and has been cut off from equally high land by the construction of the street. This construction apparently removed most of the site.

A test excavation, 2.4 × 1.6 meters, was made to the east of the house. The profile consisted of a disturbed zone, some 15 cm. thick, including the sod, above the underlying yellow-brown sand, 27 cm. thick, containing in its mid-portion many pebbles, about 2 cm. in diameter; below all was coarse yellow sand.

The disturbed zone was sterile. In the top 5 cm. of yellow-brown sand were found two small triangular points, one of quartz and the other of moderately patinated felsite, some chips of moderately patinated felsite and seven of quartz. At greater depths, chiefly mixed with pebbles in the mid-portion of the yellow-brown sand, were many chips of heavily patinated felsite, one of quartz, and six fragments of heavily patinated worked felsite. One lay at a depth of 9 cm.; the other five were at depths of 12-17.5 cm. below the base of the

[34] Andover Town Records contain many references to appropriations for cleaning the "fish courses."

disturbed zone. Unfortunately, none of these fragments were sufficiently complete for classification.

Data from this site, while extremely meager, supports evidence from Foster's Cove. Small triangular points were found in the upper portion of the yellow-brown sand and worked patinated felsite at significantly greater depths than quartz.

Harkins, Site 115

Chips of heavily patinated felsite were found on the talus slope of a sandy ridge where it had been cut into for the construction of a garage. A small brook flows beside this ridge. Two or three similar chips were found in the plowed loam of test pits near the talus, but tests in the rest of the ridge proved sterile.

SITES IN THE UPPER IPSWICH RIVER DRAINAGE

Sites 45 to 49 inclusive have been reported by collectors but were not located by the survey. Site 47, on high land, is now covered by a school playground. The other sites cover fairly large areas along the Ipswich River where chips and an occasional artifact are sometimes found. One is on high land and the other three on low sloping fields.

Silver Lake, Site 90

While only about ten feet above the present level of Silver Lake, the sandy ground between it and Lubber Brook is the highest land adjacent to the lake. A small triangular and a small-stemmed point, both of quartz, as well as chips of quartz and moderately patinated felsite were found here by surface collecting. Examination of a plowed yard did not seem to indicate that excavation would be profitable.

Martinez-Slane, Site 102

This site, on low, slightly sloping land, extends from the base of a sand and gravel ridge to the swamp bordering Lubber Brook. Three hundred artifacts, including two axes and a pestle, are said to have been plowed out of the southern portion of the site. Test holes in both the northern and southern areas failed to produce chips below the base of the plowed loam. On the surface and in the plowed zone were chips of quartz and moderately and heavily patinated felsite, a small-stemmed point of quartz, a long narrow point of felsite with a similar base, a small ovate knife and a worked fragment of felsite.

Harriman, Site 101

Across the swale from the Martinez-Slane site is fairly irregular land composed of sand containing many cobbles and some boulders, and lying about fifteen feet above the swamp. Test holes produced chips but no artifacts from the loam and underlying yellow-brown sand between depths of 5 and 43 cm. below the surface. Exploration was not extensive, but these chips appeared to be in sandy pockets in what is otherwise a very rocky deposit. All the chips were of moderately patinated felsite. In one test, granite rocks, 12.5 cm. in greatest dimension, so placed as to suggest a pavement, were found at a depth of 25-30 cm., or 5-10 cm. below the base of the loam.

Old Carter Farm, Site 50

This large site, covering some seven acres of gently sloping sandy land, has been under cultivation for a long time. Collections, including a few sherds, have been made from it. On the portion of the site owned by Mr. Porter, chips of quartz, moderately and heavily patinated felsite, and gray slate were found in gardens but no Indian material was found below the plowed loam.

Peck, Site 97

A small knoll, between the Ipswich River and a small brook, was partially plowed, at the time of the survey, for the first time in recent years. From the zones revealed on the sides of test holes it was apparent that it had also been plowed years ago. No chips were found below the base of the loam. The ground is extremely rocky and slopes fairly rapidly from granite outcrops at the top of the knoll to the swamp at the edges of the brook and river.

Chips of dark, moderately and heavily patinated felsite, quartz, rhyolite, and a few of gray slate were found. With these were two large triangular points, one small-stemmed point, and one side-notched point, two asymmetric triangular knives, two flake knives, an expanded-base drill, and portion of a polished stone, possibly a muller. The small-stemmed point was made of quartz, the other chipped implements of felsites. No sherds were found.

Peabody Pumping Station, Site 98

Two worked fragments of quartz and a few felsite chips were found at this site which has been considerably disturbed by the construction of roads and the pumping station.

Johnson Spring, Site 116

Chips were found in cultivated fields beside a small spring on the hillside

three-eighths of a mile south of the Ipswich River. A small test in fairly level, uncultivated land above the spring uncovered a large triangular point, what may be a fragment of another, a large small-stemmed point, and chips, all of dark or moderately patinated felsite, between depths of 8-20 cm., in the lower part of the loam and the transition zone between it and the underlying yellow-brown sand. Except for one chip of quartz, the yellow-brown sand was sterile. No sherds were found.

In 1948 a portion of this site was partially excavated by the Northeastern Chapter of the Massachusetts Archaeological Society. Zones in the ground from the surface downward were: dark loam, 9-15 cm. thick; yellow-brown loam, 10-20 cm. thick; and underlying yellow-brown sand. In the lowest zone one pointed base and two corner-removed spear points were found.

The intermediate zone produced asymmetric trianguloid knives, one corner-removed spear point, one pointed base, three eared, two small triangular, one large triangular, and sixteen side-notched projectile points. These side-notched points were associated with mineral-tempered pottery which had notched rims and cord-malleated, rocker-marked, dentated, and plain surfaces. Sherds with cord-malleations on both inner and outer surfaces were found at greater depth than any other form of pottery. This pottery is similar to that found at Camp Maud Eaton (see earlier). The assemblage of pottery and side-notched points is also similar to that of the Point Peninsula of New York State.

Potsherds found in the upper part and in the base of the overlying dark loam were from shell-tempered vessels with wide, flat rims. A few bore imprints of cord-wound sticks. In the lower part of the dark loam were sixteen large triangular points; from the base of this zone upward into the sod were fragments of a thin walled (3 mm. thick) globular-shaped vessel with constricted neck and thicker (6 mm.) incised, basally notched, noded collar.

This sequence of forms of points and styles of pottery is the same as that presented earlier for the Shawsheen River valley. Here, however, a period when side-notched points predominated is more evident than at any of the Shawsheen valley sites. A report of this work will be published in the *Bulletin of the Massachusetts Archaeological Society*. Cognizance of this new data is not reflected in the following discussion.

DISCUSSION

SITES in the Shawsheen River valley and surrounding areas may be examined in various ways in order to abstract generalizations. They may be considered in respect to relative size, archaeological content, geographical situation, etc. Discussion will be limited to certain rather obvious considerations.

All the sites covered by this paper might be classed as small. Lacy's, on Heath Brook, and Barron's, on the southwestern shore of Haggett's Pond, were probably the largest in area. Even these, however, were only small towns compared with relatively large metropolitan centers known to have existed on the Merrimack River. At what is now Shattuck's Farm, on that river due north of Haggett's Pond (Fig. 1), is a site which was probably the largest site in the region. It has been almost entirely destroyed by floods, sand removal, cultivation, and, according to rumor, by the recovery of Indian relics by oxen and scoops in the eighties. Other large sites existed below the falls of the Merrimack, about two miles to the east of Shattuck's, and at the outlet of Lake Cochichewick. The former is now under the factory buildings of the American Woolen Company and the latter covered by water.

GEOGRAPHIC CHARACTERISTICS

Examination of the site survey map (Fig. 1) indicates that more sites were found on the eastern and northern shores of streams than on the western and southern shores. When sites are across the river from each other, as Site 18 and 25, and Sites 51 and 85, those on the east are much larger. It is also true, but not indicated on the map, that hills are found to the east and north of most sites. This suggests that protection against prevailing storm winds may have been one factor in the choice of a location in which to live.

Examination of the ground, however, indicates that the preference was for level, fairly high, sandy land adjacent to water. Due to geological chance, such criteria are more often found in this region to the east and north of streams. When such land extends along the river as a terrace or plateau and is cut or bordered by a brook, the site will be found near the brook.

It seems clearly indicated that these features were more important to the Indian than protection against storms. The large sites at Haggett's pond (Fig. 1) are particularly exposed to storms coming from the northeast but are located on the only areas there that meet the above specifications.

Sites may, in general, be divided into two geographical groups, those on plateau-like areas adjacent to water and those on land which slopes downward

to water. In the former case, the concentration of Indian material was found near, but not at, the bank. In the latter case, more evidence of occupation was found on higher land, away from the water. Several factors may have been involved in this distribution on sloping ground.

Another fact, evident from the site survey map (Fig. 1), is that a fairly large number of sites were located on small streams. The aborigines did not show an overwhelming preference for larger bodies of water.

Nothing was found which might be presented as evidence of agriculture. Sites producing pottery were not located in places obviously conducive to agriculture nor were non-ceramic sites located contrariwise. Recent Indians must have been familiar with agricultural practices. Lack of any identifiable stone hoes suggests the use of digging sticks which have perished. Another possibility is a life having a seasonal change in location. Indians may have practiced agriculture at the shore in the summer and spent their winters in the Shawsheen valley.

ASSOCIATIONS AND CHRONOLOGY

Lists of traits, including pottery and stone tools recovered from ten sites, will be found in the table on pages 76-77. Traits have been grouped according to their occurrence in observable zones of soil in order to render more easy a comparison between inventories of traits in similar zones at the several sites. While the actual depth in the ground and the thickness of a zone may vary from site to site, the relative vertical position is rather constant.

In this tabulation a dashed line has been used to indicate the greatest depth at which pottery was found. The space between this line and the base of the loam is proportionately too large. If found at equal depths, artifacts found in the upper yellow-brown sand have also been indicated as connected with this lowest zone of pottery, whether or not they were directly associated with sherds. No pottery was found at the three sites which appear on the right-hand end of the table. Traits in boxes may go with either the zone above or below the box. The asterisk indicates relatively high frequency in a zone.

Forgetting exceptions for the moment, we observe that the tabulation indicates that at an early period many corner-removed points, a few straight-stemmed points, expanded-base drills, and semi-lunar knives were made. In an intermediate or transitional period the same artifacts are found and, in addition, there are small triangular and small-stemmed points, asymmetric trianguloid knives, gouges, pestles, and impure graphite. At the very end of this transitional period, corner-removed and straight-stemmed points are not found, but points with wide notches at the sides do occur, as do sherds of coarse mineral-tempered pottery, usually decorated by means of cord- or textile-

wrapped paddles. The final period is characterized by many triangular points, medium and large; a few large lanceolates and points which have narrow notches at the sides; soft graphite; and potsherds of coarse mineral-tempered ware, vegetable-tempered wares which tend to become the dominant form, and some fine mineral-tempered vessels.

Exceptions to the above are rare: an asymmetric trianguloid knife was found in the loam at Camp Maud Eaton, Test VI; a notched point lay below a corner-removed point at Camp Maud Eaton, Test VII; at Camp Manning, notched points were found at depths greater than those at which sherds were found; soft graphite occurred in red-brown sand at the Hofmann site. It will be observed that in all cases these "out of place" specimens were found in zones adjacent to those in which they occur at the other sites. At the Stickney site, artifacts were relatively closer to the surface because a part of the upper zone appeared to be lacking, doubtless the result of cultivation and resultant erosion; associations of artifacts are similar to those observed at other sites.

Evidence supporting the sequence of forms of artifacts proposed for the Shawsheen Valley was found in small tests at other sites. No contrary evidence at all was found, unless a corner-removed point in a hearth at the Ice House site be so considered. At the Smith site, small triangular points were found in the upper portion of the yellow-brown sand, while worked patinated felsite was found deeper. At the Fraser site, a small trianguloid point and an asymmetric trianguloid knife were found in the upper portion of the yellow-brown sand. These findings may not appear important but it seems significant that these objects were in the same relative vertical position as that occupied by similar specimens found at sites where more extensive excavations were made. We have Mr. Lacy's evidence that years ago only triangular points were found at Heath Brook, while corner-removed points predominate among current finds.

While a large amount of chance may be presumed to occur in the making of surface collections, it seems significant that associations of artifacts in such collections agree with associations from excavated sites recorded in the tabulation of traits. Mr. Hill's collection from Site 86 consists of small triangular and corner-removed points but no notched points, large triangles, or pottery. At Flint's Field, small triangular, small-stemmed, and corner-removed points, and an asymmetric trianguloid knife were found but no notched points, large triangles, or pottery. At Silver Lake, only small triangular and small-stemmed points were found. In Carter's West Field, Dr. Tyzzer found coarse mineral-tempered sherds with small triangular, small-stemmed, and notched points but no large triangular or corner-removed points. Near the Pine Ridge Cemetery, sherds of coarse mineral-tempered pottery and a point with wide side notches

were found. At the Peck site, large triangular, small-stemmed, and notched points were found, but no corner-removed points were discovered. This last site might be expected to yield pottery, but two careful searches failed to produce any.

MATERIALS FOR CHIPPED TOOLS

In the Shawsheen River valley there seems to have been definite selection of certain materials for making chipped artifacts. Changes in taste occurred from time to time and these changes appear to be linked with the passage of time rather than with availability of materials. Corner-removed points, whether from excavations or surface collections, are made most frequently of felsites which have acquired a light colored patina, less frequently of heavily patinated gray slate, and rarely of quartz, quartzite, or other rocks. The small triangular and small-stemmed points are chiefly made of quartz. Those made of felsite show a moderate patination similar to that of asymmetric trianguloid knives. Points with wide side notches are substantially more patinated than those with narrow notches. Medium and large triangular points are predominantly of felsite that exhibits little patination.

This correlation between the shape of projectile points and the material from which they are made or the degree of patination which they exhibit, while not perfect, is extremely high. In any collection from this area containing both triangular and corner-removed points of felsite, the color of the latter is, on the average, lighter because of a greater degree of patination.

As small triangular and small-stemmed points are chiefly made of quartz, and as these points occur in an intermediate vertical position in excavated sites, it follows that the use of quartz as opposed to felsite also occured in an intermediate position in the time scale. This seems important. At a total of twelve sites, quartz specimens or chips were found concentrated in the same relative position, i.e., below the loam and in the upper 10-12.5 cm. of the yellow-brown sand, irrespective of the presence of artifacts of felsite. This appears to be a fairly widespread phenomenon in the Shawsheen valley. The Hofmann site is unique in lacking any quartz industry.

As mentioned in the discussion of mineral resources, felsite is not available in the area, but quartz is. With this in mind, we can see that the earliest objects which have been discovered were made from imported material. There then ensued a period when the native quartz was utilized. Finally native material was abandoned in favor of imported material coincident with the introduction of pottery.[35]

[35] Felsite is available in quarries near the ocean, about twenty miles to the east.

TRAITS OF

ZONE	FOSTER'S COVE	MAUDE EATON Test VI	MAUDE EATON Test VII	CAMP MANNING	ICE HOUSE
Loam	Sherds Fine mineral temper *Vegetable temper Coarse mineral temper Points *Large triangular Large lanceolate With narrow notches Soft graphite	Sherds Fine mineral temper Vegetable temper *Coarse mineral temper Points With narrow notches Asymmetric triangloid knife	Sherds *Fine mineral temper Coarse mineral temper Points *Large triangular With narrow notches Soft graphite	Sherds *Coarse mineral temper Points Triangular Soft graphite Celt, grooved axe	Sherds Vegetable temper Coarse mineral temper Points Triangular
Upper Yellow-Brown	Sherds Coarse mineral tempered Points With wide notches Small triangular *Small-stemmed Hafted knives	Sherds *Coarse mineral temper Points With wide notches Small triangular *Small-stemmed Hafted knife	Sterile	Sherds Coarse mineral temper Points *With wide notches Small triangular Hafted knife Gouge Pestle	Sherds None Points Small-stemmed Impure graphite
L - O - W - E - S - T P - O - T - T - E - R - Y L - E - V - E - L - - - - - -					
or Red Brown Sand	Points *Small triangular Small-stemmed Straight stemmed Corner-removed Asymmetric triangloid knives "Beach pebble" hammerstones Gouges, grooved hammer Semi-lunar knives Impure graphite	Points Small triangular *Small-stemmed Asymmetric triangloid knife	Points Corner-removed Asymmetric triangloid knife	Points *With wide notches Corner-removed Expanded base drill Asymmetric triangloid knife	
Lower Yellow-Brown Sand or Loose Sand and Gravel	Points Straight stemmed *Corner-removed Expanded base drill *Trapezoidal knives "Battered-ball" hammerstones Semi-lunar knife *Thumb-nail scrapers	Points *Corner-removed Semi-lunar knife	Points With wide notches Semi-lunar knife(?)	Points Straight stemmed *Corner-removed	

* Indicates relatively high frequency

TEN SITES

PRINGLE	HOFMANN	VAN STEENSBURG (north end of trench)	FLINT'S WOODS	STICKNEY
Sherds Fine mineral temper Vegetable temper *Coarse mineral temper Points Large triangular With narrow notches Soft graphite	Sherds *Vegetable temper Coarse mineral temper Points *Large triangular	Sterile except for chips	Points Corner-removed Asymmetric triangloid knives Expanded base drills	Points Small triangular With wide notches Straight stemmed Corner-removed Expanded base drill Impure graphite
Sherds Coarse mineral temper Points Small triangular Small-stemmed	Sherds Vegetable temper *Coarse mineral temper Points Small triangular Soft graphite Pestle	Points With side notches Small triangular Corner-removed Impure graphite *Asymmetric trianguloid knives		Points Corner-removed
L-O-W-E-S-T P-O-T-T-E-R-Y				
Points Small triangular *Small-stemmed Corner-removed Expanded base drill Asymmetric triangu-loid knife "Beach pebble" hammerstone	Points *Corner-removed Expanded base drill Asymmetric triangu-loid knife	Pestle		
Points Straight stemmed Corner-removed	Points *Corner-removed Expanded base drill	Points With wide notches Corner-removed		

It should also be mentioned that chipped tools of gray slate were found only in the lower zone of yellow-brown sand. The average depth at which this material occurred is greater than that at which patinated felsite was found.

DISTRIBUTION OF POTTERY AND CHIPPED TOOLS

In the small area under study, little can be gleaned from the distribution of artifacts. The lower portion of the Hofmann site; the lowest zone at Foster's Cove, at Camp Maud Eaton, and possibly at Flint's Woods, are the only sites or substantial portions of sites at which it can be said that projectile points were only of the corner-removed or straight-stemmed forms. Probably the deepest zone at Camp Manning should be added to this list. It would appear that the period when only corner-removed and straight-stemmed points were made was of limited duration or that at this time the population was scant.

Unquestionably, during the transitional period, when corner-removed and small triangular and small-stemmed points were in vogue, the whole area was occupied. It appears to be the period of maximum population, especially in its later stages when quartz was the material predominately used for points. This is inferred from the following: quartz is found at more sites than any other material; at some sites it is more abundant than other materials; and at those sites whose location would appear to be less desirable, quartz and its associated moderately patinated felsite are the only materials found. Taken in combination, these facts point to the use of quartz by more people and at more places than can be inferred for other materials.

The final period of occupation, characterized by large triangular points and pottery, is represented at a restricted number of sites. Large triangular points are definitely found at only three sites in addition to those excavated, or at a total of nine sites. Pottery was used at only thirteen sites, at twelve of which one or more sherds of coarse mineral-tempered ware occurred, and at five of which vegetable-tempered sherds were found. In only two cases, in restricted areas at Camp Maud Eaton and at Lacy's, were fragments of vessels with Mohawk-like collars brought to light. One body sherd from Pringle's may be from a similar vessel.

Only four sites can be definitely considered as non-ceramic—the Clemons, Stickney, Flint's Woods, and Van Steensburg sites—and these were presumedly occupied at a period antedating the introduction of pottery. No doubt, many of the others are also non-ceramic but the amount of excavation carried on at them was not sufficient to produce conclusive evidence. The lower zones of the Hofmann, Foster's Cove, Camp Maud Eaton, Camp Manning, and Pringle sites reflect the culture of people ignorant of pottery.

CULTURE CONTINUITY

There is little evidence of any great break in cultural continuity. At no sites were the culture-bearing zones separated by extensive sterile layers. While different types of projectile points came into use at the time when pottery was introduced, the change from small to large triangular points was not a radical one. The corner-removed style continued in use for large hafted knives. While coarse mineral-tempered and vegetable-tempered pottery were decorated in different ways, a few sherds of a coarse mineral-tempered ware at Camp Maud Eaton bore decoration like that on later vegetable-tempered wares. Thus, later styles were anticipated or imitated. The overall picture is one of cultural continuity with new traits added and others dropped over a period of time.

POPULATION

The Indian population of the Shawsheen River Valley was never as large as the number of sites found by the survey might suggest. Not only are various periods in time represented but there is no reason to assume that all sites of any one period were occupied simultaneously. Many of the sites are small, and probably they were occupied by only a very few families. Apparently the favored small sites were occupied by a few people over a long period of time, either continually or intermittently.

Minor variations between the inventories of material culture from nearby sites, such as Foster's Cove and Camp Maud Eaton, suggest the possibility of intermittent occupation, a periodic changing from one site to another.

COMPARISONS WITH OTHER AREAS

INDICATIONS OF RELATIVE CHRONOLOGY FROM EASTERN MASSACHUSETTS

THERE are suggestions that changes in the shape of projectile points and in the character and decoration of pottery occurred in other areas of eastern Massachusetts just as they did in the Shawsheen River Valley. Delabarre, in 1925,[36] pointed out that there was a significant difference between the percentage of triangular points in his collection from Grassy Island (17 per cent) as compared with similar collections from sites on the nearby Assonet Neck in which triangular forms constituted 83 per cent of the total of projectile points. Practically all of these triangular points are made of quartz and are of the type which I have called "small triangular." The work of Raup and Johnson demonstrates Grassy Island to have some antiquity.[37] The figures for Grassy Island which Delabarre published (17 per cent) and those for Faulkner Spring reported by Robbins (6.5 per cent)[38] are substantially less than the percentage of triangular points at the protohistoric Ford site where this form comprised 66 per cent of all points found.[39] It appears to be significant from the point of view of chronology that there is such a sharp difference between the percentage of triangular points at this late site and percentages at the other two, at least one of which is known to be earlier.

The inventory from Grassy Island includes many more corner-removed points than is usual for surface collections from that region. It seems significant that presumedly the oldest habitation site investigated should have a large number of these points.

Stratigraphic evidence may also be marshalled. The Davis Farm site in Sudbury was partially excavated by the Charles C. Willoughby Chapter of the Massachusetts Archaeological Society. The profile consisted of a somewhat disturbed humic deposit, 30 cm. thick, an underlying occupation layer, 25 cm. thick, and a deeper dark yellow layer, 35 cm. thick.[40] The author was granted permission by Mr. Benjamin L. Smith of Concord, Chairman of the Chapter, to examine the specimens and specimen cards. Small triangular, small-

[36] Delabarre, 1925, p. 362.
[37] Raup and Johnson, 1947.
[38] Robbins, 1944.
[39] Robbins, 1946.
[40] Movius, 1941.

stemmed, small ovate, small lanceolate, and side-notched points were found concentrated in the layer of occupation. None of these points was deeper than 50 cm. below the surface. An eared triangular point was found at a depth of 57 cm. Of four corner-removed points which were found, one was at the base of the occupation layer and three were deeper, at depths of 55-75 cm.

At the Faulkner Spring site, in Norton, 77 per cent of the specimens were concentrated in a zone 10 cm. thick, at the junction between the humus layer and underlying yellow soil.[41] Only two typical corner-removed points were found. Both were "found in the yellow soil, well below humus."[42]

At the Peaked Hill site, east of Provincetown, on Cape Cod, Moffett found seven large triangular points in old sod beneath recent dune sand. In underlying brown sand he found three arrow points and seven spear points with pointed stems, presumedly a variant of the corner-removed form.[43]

At the Cliff Shell Heap, at Truro, also on Cape Cod, a thin gray layer separates the shell heap from overlying dune sand and extends laterally beyond the concentration of shell. Moffett found six large triangular points at this site, two in the gray layer directly over the shell and four in the extension of the gray layer. In the underlying shell heap there were, in addition to sherds, one medium and one small triangular point, one side-notched, five straight-stemmed, and twenty-six corner-removed points.[44] Most of the latter are made of quartz. Some are typically corner-removed but many are intermediate between corner-removed and large small-stemmed points.

In a stratified shell heap at Wellfleet, Cape Cod, Boissevain found triangular points in the upper heap and a stemmed point in the lower heap.[45]

In the loam at Seth's Swamp, in Wellfleet, Cape Cod, Torrey found sixty-seven small and large triangular points mingled with shell-tempered pottery, which had plain rims and exteriors decorated with impressions of fabric and of cord-wound sticks. In underlying yellow sand he found one side-notched point, some straight-stemmed points and about twenty-five corner-removed points as well as fragments of coarse mineral-tempered pottery. Most rim sherds exhibited notches along the finished edge. Some bore impressions of fabric- or cord-wrapped paddles on interior surfaces. Some were similarly decorated on exterior surfaces. Shallow punctates or impressions of what appear to be carved bone tools appeared on some sherds. In some cases, punc-

[41] Robbins, 1944.
[42] Robbins, personal communication.
[43] Moffett, 1946.
[44] Moffett, personal communication.
[45] Boissevain, 1943.

tations were combined with fabric impressions. Some sherds were undecorated.[46]

At a large site in Middleboro, Massachusetts, excavated by the Middleboro Archaeological Society, stemmed points were found at a greater average depth than triangular points.[47] These stemmed points were of the type I have called small-stemmed. No corner-removed points were found.

SOUTHERN NEW ENGLAND

At Jones Pond Shell Heap, in East Providence, Rhode Island, "grit tempered sherds were largely found in lower depths than the shell tempered ones." "Triangular points were invariably found in the Trampled [upper] Layer" while stemmed and notched points of various types were found lower.[48]

Praus, in his report on the Basto site at South Woodstock, Connecticut, presents a tabulation indicating that 46 of 105 projectile points found in the humus were triangular, while in the lower yellow soil only 4 of 35 points were triangular.[49]

It is evident from the above that the sequence of forms found in the Shawsheen River Valley has parallels in eastern Massachusetts, Rhode Island and Connecticut. A change in the shape of projectile points from corner-removed to triangular, with notched points occupying an intermediate temporal position, is indicated for a fairly large area.[50] Coarse mineral-tempered pottery was made before either vegetable- or shell-tempered pottery. Decoration was achieved by impressions of the cord-wrapped paddles which were used to smooth and finish the vessel. At a later date, cord-wound sticks were used to impress designs.

The only possible contrary evidence that the author has been able to find comes from the Hornblower Shell Heap on Martha's Vineyard excavated by Byers and Johnson.[51] Of the few corner-removed points found, about half were in shell and half below shell. Other projectile points had approximately the same vertical distribution as corner-removed points.

COMPARISONS WITH NEW YORK STATE

Skinner's work at Throg's Neck, New York City, suggests that there was at the site a sequence in types of projectile points similar to that demonstrated

[46] Torrey, 1946.
[47] Mr. William L. Greene, Middleboro, Massachusetts, personal communication.
[48] Brown, 1939.
[49] Praus, 1945, p. 34.
[50] For more details on some of these sites see Bullen, 1946*c*.
[51] Byers and Johnson, 1940.

for the Shawsheen River Valley. While Skinner is not specific as to all types found at Throg's Neck, the following is evident from his report: small triangular points were found only near the top; points made of quartz and having bases intermediate between corner-removed and small-stemmed were abundant at greater depths but disappeared towards the top; a narrow side-notched form was "also common in the depths of the heap, but probably survived until the last occupancy." The provenience of only one of three corner-removed points is given; it was in "undisturbed yellow soil, under deepest part of Deposit A."[52] Deposit A consisted of shell and was four to five feet deep. The generalized sequence at Throg's Neck—corner-removed, stemmed and side-notched, triangular, from bottom to top—is the same as that found in the Shawsheen River Valley.

In upstate New York the situation is more complicated. Nevertheless, corresponding changes in projectile point shapes may, in a generalized way, be shown. The notable exception is in the lack of any corner-removed points at Lamoka or of any Lamoka-type points in the Shawsheen River Valley. However, the side-notched expanded-base drill found at the Hofmann site is found in Lamoka.[53]

Corner-removed points, usually large, represent 8-10 per cent of the projectile points from the Oberlander and Robinson sites and from both levels of Frontenac Island, all of which are reasonably early.[54] Only a few have been found at the Vosburg, Schermerhorn, and Van Orden sites of eastern New York.[55] Small-stemmed points appear to be virtually absent from collections from upper New York State, but their shape is extremely close to that of some of the small Lamoka-like "holdovers" at Frontenac Island.[56] This type also appears to be a trait found in the Orient Focus of Long Island.[57]

Points found at the Lamoka site are vaguely reminiscent of our points with side notches; there is an even closer resemblance between the latter and certain points found on Frontenac Island, and at the Robinson, Vosburg, and Schermerhorn sites.[58] The resemblance between our wide side-notched points and those from the Schermerhorn site seems closest. The type of point with

[52] Skinner, 1919.
[53] Ritchie, 1944, Pl. 154, No. 35.
[54] *Ibid.*, Pls. 115, 110, 146, 147, and tables in rear of book.
[55] *Ibid.*, Pl. 124, No. 16; Pl. 50, No. 55; p. 106.
[56] *Ibid.*, Pl. 147, Nos. 6-15, especially 8, 9, and 15. For a better print of these points see Ritchie, 1945, Pl. 7.
[57] *Ibid.*, Pl. 107, Nos. 6, 9.
[58] *Ibid.*, Pl. 154, No. 15; Pl. 147, No. 37; Pl. 110, No. 88, 89; Pl. 124, No. 17; Pl. 50, No. 40.

narrow side notches found in the Shawsheen Valley appears rarely in Vosburg and Point Peninsula (Menard Bridge).[59] One was found at Castle Creek.[60]

All of the large triangular points from the Shawsheen River Valley are within the range of variation of similar forms reported from the Owasco and Coastal aspects of New York State, particularly as regards those from sites in eastern New York—the Turnbull, Van Orden, and Schermerhorn sites.[61] Forms similar to our small triangular points have been found at the Schermerhorn site but not at the Turnbull or Van Orden sites. Schermerhorn is considered to be the earliest of the three, a finding which agrees with the sequence demonstrated for the Shawsheen River Valley.

At the Robinson site, Ritchie reports that 79 per cent of all triangular points were in the upper half of the debris and 70 per cent of all large notched and stemmed points were in the lower half.[62] At Frontenac Island all the triangular points were in the top seven inches.[63]

From the above it will be seen that, as a broad generalization, the sequence of projectile points in the Shawsheen River Valley is similar to that in New York State.

The Flint's Woods and Van Steensburg sites on Martin's Brook (Fig. 1, Sites 105 and 95) appear to be somewhat different from the excavated sites on the Shawsheen River. While typical small triangular and corner-removed points were found, the emphasis seems to be on narrow and broad side-notched points, thick and roughly made, and on asymmetric trianguloid knives. The better-made forms of the latter approach closely the fairly large isosceles triangular points from Robinson and Vosburg.[64] Some have "ears" at the corners. Some of the side-notched points have "rubbed" bases. These are good "Laurentian" traits.[65] At Vosburg sites, relatively great quantities of blanks or asymmetric trianguloid knives are found.[66] It appears that the culture of the people who lived at the Flint's Woods and Van Steensburg sites resembles that of the "Laurentian" people of New York State more closely than does the culture of the inhabitants of other sites reported in this paper.

Pottery found in the Shawsheen River Valley also bears certain resemblances

[59] *Ibid.*, Pl. 124, No. 9; Pl. 68, No. 4.
[60] *Ibid.*, Pl. 26, No. 5.
[61] Through the courtesy of Mr. P. Schuyler Miller, and of Mr. Vincent J. Schaefer, both of Schenectady, N.Y., the author examined the specimens from these sites.
[62] Ritchie, 1940, pp. 48-49.
[63] Ritchie, 1945, p. 14.
[64] Ritchie, 1944, Pl. 111, No. 22; Pl. 123, No. 25 and 29.
[65] Ritchie, 1940, p. 27 mentions rubbed bases.
[66] Mr. Vincent J. Schaefer, Schenectady, N.Y., personal communication.

to ceramics found in New York State. The coarse mineral-tempered ware with straight sides, simple rounded rim, and surface treated inside and out with cord- or textile-wrapped paddles represents one of the earliest types of pottery in both areas. In New York, this ware—Vinette Type I—was found in the superior levels of the Lamoka, Oberlander, and Robinson sites, and in stratum 2 of the Vinette site.[67] The extremely few rocker- and dentate-decorated sherds found at Camp Maud Eaton represent the second type of Vinette pottery.

While vegetable-tempering seems to be a phenomenon at present known to be local to the Shawsheen River Valley only, the slight eversion of the lip and the form of rim characteristic of vessels of these wares have their counterpart in the second type of pottery from the Vinette and Robinson sites described by Ritchie.[68] The technique of using a stick wrapped with string in an open spiral for making impressions on pottery is rare in New York, but such impressions occur on sherds found at Vinette and also at Turnbull, an Owasco site.[69]

The decoration of the fine mineral-tempered sherd from Foster's Cove (Pl. V, 1), while by no means typical, is within the range of Owasco decoration.[70] The Iroquoian form of rim found at Camp Maud Eaton needs only to be mentioned.

The pottery sequence for the Shawsheen River Valley given in this paper agrees with that for central New York demonstrated by Ritchie and that for coastal New York and Connecticut given by Smith and Rouse. Under the nomenclature used by the two latter writers, the coarse mineral-tempered wares are characteristic of the North Beach and Clearview Foci of the Windsor Aspect; the decoration of the vegetable-tempered ware, the incised sherds and those of Iroquoian type would fall into the East River Aspect or tradition.[71]

COMPARISONS WITH SOUTHEASTERN UNITED STATES

Large corner-removed points, such as were found at the Hofmann and Pringle sites, are extremely similar to those found at Koens-Crispin and Red Valley in New Jersey,[72] at Stalling's Island in Georgia,[73] at the Cypress Creek

[67] Ritchie, 1944.
[68] *Ibid.*, pp. 165 and 241.
[69] *Ibid.*, Pl. 114, No. 26; also sherd VEH 1167 from Turnbull site.
[70] Ritchie, personal communication.
[71] Smith, 1947; Rouse, 1947.
[72] Hawkes and Linton, 1916; Cross, 1941.
[73] Claflin, 1931.

villages in Kentucky,[74] in various shell heaps on the Tennessee River[75] and in middens of the Tchefuncte culture.[76] They represent the form of projectile point most typical of the eastern "Archaic."[77]

At Ct°17, Webb found corner-removed and straight-stemmed points, drills like those from the Hofmann site, and asymmetric trianguloid knives.[78] At LU°25, he found corner-removed points and those with wide side notches associated with expanded-base drills, and ovate and asymmetric trianguloid knives.[79] At Chiggerville, Webb and Haag report the same forms of points and drills, and thumb-nail scrapers like those from the lowest zone at Foster's Cove.[80]

In view of the above evidence, it may be suggested that the cultures of eastern Massachusetts developed from an "Archaic" base which was the same as that from which other early cultures cited above appear to have developed. Only in the case of Lamoka does the similarity break down. It will be recalled that no Lamoka-like points were found in the lower zones of sites on the Shawsheen and that no corner-removed points were found in Lamoka. A few of the spear points from Lamoka have a straight-stemmed base; a similarity in forms of drills may be shown, as the form with an expanded side-notched base is common to Lamoka and the Hofmann site.[81]

Changes in the shapes of projectile points noted in the Shawsheen River Valley parallel similar changes in the Mississippi and Ohio River Valleys. The heavy stemmed (corner-removed) points of the "Archaic" are the major form in Adena; the side-notched form ranks second in importance.[82] The Hopewell culture offers the notched point, in all varieties, as the prevailing mode. Fort Ancient people relied on the triangular form, with notched points a close second.[83]

It is evident that the life of the Indian of New England was subject to influences which, though somewhat attenuated, were similar to those affecting the lives of his cousins in the central part of the country. Cultural processes which were felt in New England cannot be considered as separated from those felt in the rest of the eastern United States.

[74] Webb and Haag, 1940.
[75] Webb, 1939; Webb and Haag, 1939; Webb and DeJarnette, 1942.
[76] Ford and Quimby, 1945.
[77] Ford and Willey, 1941.
[78] Webb, 1939.
[79] Webb and DeJarnette, 1942.
[80] Webb and Haag, 1939.
[81] Ritchie, 1944.
[82] Webb and Snow, 1945.
[83] Griffin, 1943.

SPECULATIONS

EVIDENCE which has been presented here indicates that as time went by several distinctive shapes of projectile points came into vogue among the inhabitants of the Shawsheen Valley. The change from large and heavy points to smaller and lighter points of corner-removed form may reflect the introduction of the bow and arrow. Certainly, the small triangular and small-stemmed points would have been well fitted for use with this weapon.

These small points, predominantly made of quartz, seem to reflect a tradition different from that which gave rise to the "corner-removed" points. The small-stemmed point may have been derived from the corner-removed point but it may equally well be an attempt to reproduce the Lamoka type of point in quartz.

The shift, on the part of the people of the Shawsheen River Valley, from the use of felsite, which had to be imported in order to make the artifacts found at greater depths, to that of quartz is an intriguing cultural change. It is doubtful if the inhabitants were forced to make this change in material by reason of an exhaustion of the felsite quarries. Was there a decrease in the supply of large game so that only very small points were required? Were there changes in hunting techniques? Does it indicate an admixture of new people not familiar with the quarries to the east or conditioned to the use of quartz? Does it suggest that, with the introduction of horticulture and a more sedentary way of life, visits to the shore were no longer undertaken?

As small triangular points of quartz and small-stemmed points, either of quartz or gray slate, are common and fairly old in southern New England, influences from that area, with or without agriculture, may perhaps be responsible for the shift.

The side-notched points, first used at about the same time as that at which pottery was introduced, and in succeeding years, are present in too small a quantity to be considered typical of local cultures. They must, it would seem, indicate that influences were exerted from outside regions, presumably from the west where one might also look for the origins of pottery. As noted earlier, a few corner-removed points appear in the sequence in New York State at what is believed to be about the same relative time as pottery and side-notched points appear in the Shawsheen River Valley.

The large triangular points of felsite, found through a substantial range in depth and associated with pottery but with practically no heavy tools, present another interesting cultural manifestation. Were new sources of felsite found?

Was the planting of corn restricted to coastal regions having a longer frost-free summer? Did the ascendency of the Iroquois in New York displace people who scorned to use quartz and result in their migration from the west? Did an increase in warfare make larger points desirable?

We have no answers to these and many other questions.

CONCLUSIONS

THE excavation of the Hofmann site and that at Foster's Cove crystallized certain problems which had not theretofore been evident. These were propounded as nine questions of both geological and archaeological nature in the introduction to this paper (page 10). The survey was undertaken in an effort to obtain answers to these questions.

Geological questions were formulated as follows:

1. Are these (the Hofmann site and Foster's Cove) and other sites located on remnants of old river terraces?
2. If so, is there any possibility of evolving a relative dating for sites by geological means?
3. Are all the sites at which there are suggestions of stratigraphy so situated that slope wash in some form or other might be considered the burying agency?
4. Are there groups of geographically similar sites?

The data secured seems insufficient to supply answers to any of the above questions.

Archaeological questions which arose were:

1. Could other sites be found at which there was a similar sequence in shapes of projectile points? To this question the answer is "yes," as we hope has been amply demonstrated above. Outstanding are Camp Maud Eaton and the Pringle site.
2. Could sites be found representing only one of the three postulated cultural manifestations? Again the answer is "yes," if we may consider that these were not three disparate entities, but peaks or nodes in a cultural continuum. However, relatively pure manifestations were found only at small sites.
3. What was the distribution of these types of projectile points in terms of number of sites or in terms of a group of sites having similar geographical attributes? To the latter half of this question no answer can be given because no correlation between types of points and geographical attributes of sites can be observed. The period of culture history characterized by small triangular and small-stemmed points of quartz is represented at more sites than those periods during which large triangles or corner-removed points were in use.
4. Could coarsely tempered paddle-decorated pottery be found at other sites in a situation substantiating the belief that it might represent a relatively early ware locally? Yes. Again, Camp Maud Eaton and the Pringle site furnish the best additional evidence and confirm this hypothesis.
5. Could any particular type of projectile point be associated with this early

type of pottery? Apparently side-notched points appear coincident with the introduction of pottery.

It should be noted that additional data which were secured require a slight modification of the interpretation of data obtained at Foster's Cove. Three definite cultural manifestations may still be postulated, but they have to be viewed, not as separate and distinct entities, but, like one frame of a motion picture film, as static situations abstracted by the student from a dynamic continuum.

PART TWO

THE CLARK'S POND SHELL HEAP

INTRODUCTION

ALONG the northeastern shore of Massachusetts, southward to the roots of Cape Ann, lie a series of sandy beaches. All are long and narrow, and though all but Plum Island are now tied to the mainland by either sand or salt marsh, many appear to have been developed as off-shore bars. Plum Island is one of the latter. Dominating the landscape, and often rising from the salt marshes which have grown up in the protection of these beaches, are rolling hills of glacial debris called drumlins. Some formerly stood in the sea, but they have succumbed to beating of the waves, leaving only piles of boulders to mark their former locations; their sand has been added to that brought down to the sea by the Merrimack, the Ipswich, and the Parker Rivers, and by lesser streams. Formerly the beaches were backed by a growth of white pine, oaks, and bushy or creeping plants which tied down the sands. Since settlers have cut these trees and plowed the land, the fierce winds which sweep across the marsh have heaped the sands in tumbled dunes and buried the farms of those who set them loose. In hollows between the dunes are shallow ponds and thickets of black alder and blueberry, laced with catbrier, where today myriads of small animals and even a few deer take shelter from the rare pedestrian who fights his way through shifting sands. The hardier bayberry and beach plum are found here too, but they also climb over the rims of these sheltered bowls to brave the winds and anchor the sands.

The salt marshes are cut by the Plum Island, Parker, Rowley, and Ipswich rivers, as well as by the innumerable creeks which thread their way through straight-sided channels. These waterways abound in aquatic life, and are visited annually by runs of alewives, shad, and striped bass, as well as trout, white perch and sturgeon. Waterfowl in numbers still visit the marshes on their annual migrations, and there find food and rest. In Indian times the region must have formed a paradise for waterfowl, shore-birds, and waders, and for all the small animals whose homes are along its edge. It must also have formed a very attractive home for the Indians, with animal food in many forms to be had for the asking in thicket, creek, or marsh.

Jutting into the waters of Plum Island Sound midway between the southern tip of Plum Island and the present town of Ipswich is Great Neck, which is made up of three connected drumlins; a fourth, Little Neck, lies to the south, at the mouth of the Ipswich River, and is connected to Great Neck by a low sandspit. Eagle Hill, a short distance to the west of Great Neck, appears to be a kame. High tides cover the marsh that lies between the hills of Great Neck and the mainland, turning the hills into islands and making communication possible only over the causeway formed by the modern road.

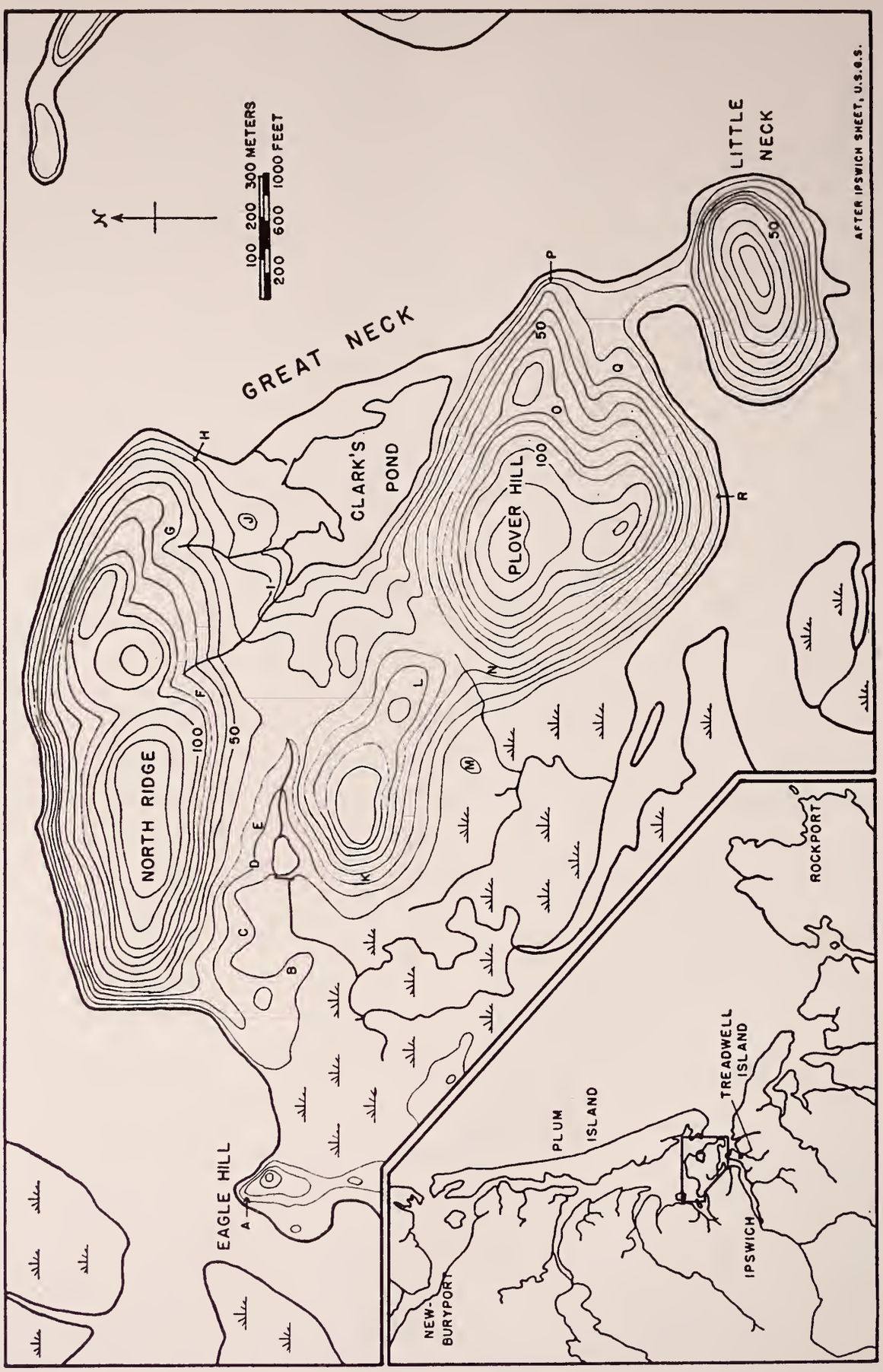

FIG. 14. Map of Great Neck, Ipswich, Massachusetts.

Clark's Pond is an artificially formed body of water on the eastern side of Great Neck,[84] Ipswich, in northeastern Massachusetts (Fig. 14). Partial excavation of the shell heap on the north shore of this pond (Fig. 14, J), and a survey of Great Neck were carried on during the summer and fall of 1946.[85] This work was done to determine whether archaeological evidence could be found which would suggest cultural changes occurring with the lapse of time similar to those which occurred in the Shawsheen River Valley twenty miles to the west.[86] It was also expected that the bone constituent of material culture, absent at nearby inland sites due to the acidity of the soil, would be present to supplement lithic and ceramic traits.

Reasonably similar suggestions of cultural change were found, in the sequence both of shapes of projectile points and of types of pottery. Additional traits were also found in stone and pottery, traits suggestive of cultural influences apparently not present in the Shawsheen Valley.

As indicated on the map (Fig. 14) Great Neck consists of three ridges, two of which rise over 120 feet above sea level. These ridges and the surrounding land consist of clayey till which is very impervious to water. Occasional small erratic boulders are found on the hillsides. On the lower southwestern slopes of North Ridge (Fig. 14, D and E) sand is found mixed with this clay. Otherwise very little sand is present except at the beaches along the shore.

Finer sediments and decayed vegetable matter have collected in the saddles between the ridges forming "peaty" deposits under the present sod. Because the underlying clay is impervious and the slopes gentle, the "peaty" deposits act as reservoirs for water and supply the small streams shown on the map which drain these saddles. During a moist summer, they furnish a constant supply of drinking water. Both the ponds shown on the map—Clark's Pond and the one to the west—are artificial, having been formed by recently built dams. The Salem sheet, U.S.G.S., based on the survey of 1886, shows Clark's Pond open to Plum Island Sound at the location of the present dam. Prior to the building of this dam, about 1895, Clark's Pond was a marsh. It may have been a tidal flat in Indian times. Today cat-o'-nine-tails grow along the shore of Clark's Pond and a thick growth of peat is to be found below the dam.

[84] From Colonial times there have been changes in names used in this area. Originally Jeffrey's (Jeofrye's) Neck referred to all land from Eagle Hill to Little Neck. This paper follows modern usage. For earlier names see Waters, 1912.

[85] Deep appreciation is due Mr. Alexander B.C. Mulholland of Ipswich for permission to do this work.

[86] See, in addition to Part I of this paper, Bullen, 1946*a*, *b*, *c*.

While Great Neck is covered with a good growth of sod, it is practically without a tree. This situation has existed for a long time, as Jeffries Wyman, writing about this area in 1867, said, "A few basswood trees have been known to exist there within a few years, but otherwise those hills do not appear to have been wooded within the memories or traditions of present inhabitants."[87]

Wyman seems not to have checked Ipswich town records. Recorded are votes and actions regarding prohibition, permission, and fines for cutting down trees at Great Neck from 1650 to 1770.[88] There seems to be no question but that some trees were present during the period of Indian occupation, and that it was not necessary for Indians to bring their firewood to Great Neck from the mainland.

Great Neck was part of the original common grounds of Ipswich, administered by the town from 1634 to 1713 and from then until 1896 by the Proprietors of Jeffrey's Neck. William Jeffrey, who came to Weymouth in 1623, somehow acquired from "Indians a title to the great neck of land still called by his name." In 1660 the town of Ipswich paid him a sum of money to clear the title. Apparently Great Neck was suitable for pasturage when the first settlers came in 1633. It has been used for that purpose from 1639, if not from 1634, to 1894. Fishing shacks and stages were built along the shore of Eagle Hill, the southern side of Plover Hill, and on Little Neck but it is clear from the records that only a small portion has ever been tilled.[89] Letters "A" to "R" on the map (Fig. 14) indicate locations where the author found indications of Indian occupation. The most extensive of these are at "F," "G," "J," "L," and "O." Summer cottages now cover Eagle Hill, the north and east shore of North Ridge, the south and east shore of Plover Hill, and all of Little Neck. A comparison of these areas with those given on the map for aboriginal occupation indicates that, in general, the two areas do not coincide. The builder of summer cottages seems to demand "good view," "fresh air," and propinquity to a paved road. The modern summer resident does not mind scrambling down a twenty foot cliff for a swim or a sail. With his technology he can pipe drinking water into his home. The location of Indian sites appears to be conditioned by drinking water and, possibly, protection against storms. The Indian seems to have preferred a shore sloping gently down to clam flats and places where canoes could be drawn up above high tide.

[87] Wyman, 1867, p. 9.
[88] Waters, 1912.
[89] *Ibid.*

PREVIOUS WORK IN THE AREA

A fair amount of archaeological activity has occurred at and around Great Neck. Jeffries Wyman reported in 1867 on excavations at Eagle Hill:

> This [shell heap] consists of several disconnected deposits of shells, which are in part spread out into a uniform layer, but in a few instances form small knolls from eight to ten feet in diameter. Near the water's edge the shells are exposed by the washing away of the bank, but elsewhere are covered with mold and turf, and, in some places, even on the knolls, with a layer of gravel.[90]

These deposits consisted almost exclusively of shells of the common clam (*Mya arenaria*). A few shells of the oyster and of the sea clam (*Spisula solidissima*) were present. While Wyman classes his digging at Eagle Hill as "extensive," only a few artifacts, a grooved net sinker and some worked bone, were found. Wyman places the site on the eastern side of Eagle Hill diametrically opposite from "A" (Fig. 14). At "A" the author found old shells in the face of an eroding cliff.

In 1882 this site was investigated again, this time by John H. Sears and John Robinson of the Essex Institute, Salem. They found shells of the clam, quahog, and oyster; hammerstones; an anvil stone (?); a notched sinker; fragments of a pestle and of a gouge(?); a disc scraper; a rectangular knife; three projectile points (one small triangular, one spear with corner-removed type of base, one fragmentary); bone awls; worked and decorated bone fragments, and a fragment of a pipe stem of shell-tempered clay.[91] This collection, while small, is substantially greater than that secured by Wyman. Other specimens from Eagle Hill in the Peabody Museum, Salem, indicate the presence at this site of mineral-tempered pottery, single-barbed bone points, and a spoon of porpoise jaw.

In 1882 a party from the Essex Institute completely excavated a shell heap at Treadwell's (Perkins') Island across the Ipswich River from Great Neck (Fig. 14). According to Robinson's report, this heap was continuous, oval in shape, measuring 60 × 100 feet, and varied in thickness from "a few inches on the outside to rather more than three feet in hollows."[92] At the southern and northern ends were areas about ten feet across and two feet thick, in which the deposit consisted of oyster shells. Most of the heap was composed of shells of the common clam mixed with those of the sea clam and quahog plus a few mussel shells. Samples of shell, food bones, and all possible artifacts were saved.

The collection, now at the Peabody Museum, Salem, includes human bones,

[90] Wyman, 1867, p. 9.
[91] Peabody Museum, Salem, catalogue of collections of the Essex Institute.
[92] Robinson, 1882.

chips, burnt rocks, hammerstones, five projectile points (two triangular, one large and one medium-sized stemmed, and a corner-removed spear point, somewhat similar respectively to Pl. XVI, 5, 27, 10, 26), fragments of a gouge, a polished celt, and a pestle, three plummets, fifteen mineral- and seven shell-tempered sherds, a long bone bead, a bone awl, two multibarbed bone points, and a socketed antler handle(?). Found nearby, but not in the shell, were a thumb-nail scraper, a small ovate knife, and three projectile points. Of the latter, two were stemmed, similar to Plate XVI, 10, and one, a spear point, had a base of the corner-removed type, similar to Plate XVI, 26.

This collection seems woefully small for the area dug, apparently well over 3000 square feet. It is interesting to note F. W. Putnam's comment in the Bulletin of the Essex Institute that "it contained more stone implements than have been found in all other shellheaps in this vicinity investigated by Wyman, Morse, Cooke, and myself put together."[93] Apparently the Treadwell's Island shell heap represented a midden deposit. If one may judge from conditions at the Clark's Pond site, the "living" area at Treadwell's Island was not dug. Probably the "habitation" area was the small knoll to the west or the gently sloping land to the south of the shell heap where Robinson said the heap "was lost in a ploughed field."[94]

While there is no record in W. K. Moorehead's "Merrimack Archaeological Survey" of work done at Great Neck, he does mention Castle Neck to the south and Plum Island to the north.[95] Mr. Ramsey J. Sinclair of Ipswich has advised me that about thirty years ago men dug along the tops of the ridges from Eagle Hill across Great Neck. These may have been Moorehead's men looking for graves on another occasion; the date is too early for the Merrimack survey which was made in 1930. Nothing is supposed to have been found except in the saddle on the eastern side of North Ridge at a spot locally referred to as Indian Spring. No record of what was found there is available. Sinclair did some digging at Great Neck, chiefly on the southeastern slope of North Ridge (Fig. 14, near F) but he also dug in other places. He kept no record of his work.

The author surveyed Great Neck and found evidences of Indian occupation at places indicated by letters on the map (Fig. 14). "A," "H," "P," and "R" are locations where erosion from wave action has exposed shells and black dirt in the face of the cliff, 15-30 cm. below the present surface. In association with such deposits of shells, part of the vertebra of a deer was found at "R,"

[93] Putnam, 1882, p. 161.
[94] Robinson, 1882.
[95] Moorehead, 1931.

and chips and sherds of mineral-tempered pottery at "P." At "C," "I," "M," and "Q," chips were found; at "B," chips, mineral-tempered sherds, and a fragment of a plummet(?). At "D" and "N," test holes produced chips and mineral-tempered sherds from a narrow zone, 15-27 cm. below the present surface. At "K," a road cut exposed a pit filled with clam shells and a deposit of shells and black dirt, 150 cm. long and 8 cm. in maximum thickness. At "F," "G," "L," and "O," tests indicated extensive areas of shells, 5-15 cm. thick and covered with 15-20 cm. of dirt and turf. The main part of this report is concerned with work done at "J" and its results.

Tests at "E" uncovered several small deposits of shells. One such small irregularly shaped deposit, about 150 cm. in diameter, and part of another similar deposit were excavated. These deposits were only 2.5 cm. thick and covered with 18 cm. of brown loam and sod. Below them were 2.5 cm. of similar loam resting on mottled clay, 9 cm. thick, which overlay reddish sandy clay. In the brown loam above the shells, down to a depth of 15 cm., were fragments of a glazed blue-edged Staffordshire plate and part of a horseshoe. Possibly this area had been cultivated but, if so, cultivation had not penetrated deeply enough to scatter the shells. The deposit consisted of finely trampled shells of the common clam and the sea clam mixed with dirt and broken rocks. Many broken rocks were found below the shells and in the lower part of the surrounding brown loam. Associated with the layer of shells and also found below it were chips, fragments of deer bone, and sherds of mineral- and shell-tempered pottery. This area has been mentioned in some detail as it seems to represent the earliest beginnings of a shell heap in which each deposit of shells represents approximately one meal for a small group or family.

Area "L" was investigated in May, 1947, by the Northeastern Chapter of the Massachusetts Archaeological Society.[96] They found irregularly shaped areas of shells in the lower part of clayey loam. The list of species of mollusks found there did not differ significantly from those found at the Clark's Pond shell heap (Fig. 14, J). Associated with the shells, or at equivalent depths, where shells were not present, were bones of the deer (*Odocoileus virginianus borealis*), five medium-sized triangular projectile points, a thumbnail scraper, a crude turtleback, a small celt, a fragment of a bone awl and of decorated bone, and about 100 small sherds. The underlying clayey subsoil was culturally sterile.

In one place there was a deposit which was composed of cobblestones and which measured 113 × 120 cm. These rocks occupied a zone, 8-10 cm.

[96] Bullen and Burt, 1947. Much of that which follows has been taken, some *verbatim*, from this source.

thick, in the lower part of the loam. Some of the rocks were reddened as if by heat. Black dirt and charcoal covered these rocks but was not packed among them as might be expected if these rocks represented a hearth.

Five pits, one of which contained a burial, had all been dug from the level of the deposits of shell. The burial was that of an elderly female. It was flexed, lying on its left side with head towards the southeast, and unaccompanied by burial goods. The burial pit had been partially lined and about seventy-five percent of it was also capped with cobblestones.

Pottery was equally divided between shell- and mineral-tempered sherds but most vessels were mineral-tempered, if one may judge from rim sherds. All rims had been flattened and, with one exception, all rim sherds were from straight-sided vessels. Three shell-tempered sherds joined together to form the pointed bottom of a vessel. Marks on the external surfaces of sherds of shell-tempered pottery 4-5 mm. thick may be faint imprints of cord- or textile-wrapped paddles. Except for these, sherds ranged in thickness between about 7 mm. and 8 mm. Decoration was achieved by impressed elements in the form of dots, fingernail marks, dashed lines, and imprints of cord-wound sticks and rocker-like tools.

In the course of discussion, this site will be referred to as the Neck Creek shell heap.

THE EXCAVATIONS

MAIN EXCAVATION

A SKETCH map of the site at Clark's Pond is given in Figure 15, an excavation plan in Figure 16, and various profiles in Figure 17. The site is situated on the top and sides of a small knoll. Land to the north rises fairly sharply to a substantial height, giving some protection against storms, while that to the south slopes gradually to what used to be a tidal flat or marsh—now Clark's Pond (see also Fig. 14, north and south of J). The small brook to the west is a fairly permanent source of fresh water.

The reference grid used in excavation is indicated on the excavation plan (Fig. 16). Stakes were lettered from south to north and numbered from east to west. Number and letter of the stake at the southeast corner was used as the designation of each square. A stake was driven as an arbitrary datum and later tied in approximately by plane table to contours of the Ipswich Quadrangle, U.S.G.S., 7½-minute series.

As the zone containing Indian material measured only 10-20 cm. in thickness, it was evident that any suggestions of relative chronology based on stratigraphy would have to result from the comparison of specimens found in shell deposits with those found below them. Consequently work was not continued for any substantial distance beyond edges of shell deposits. As extremely few specimens were found in the six most northeasterly squares dug, and none in Square 10O, it is believed that the site does not extend far in these directions.

Contours on the excavation plan (Fig. 16) indicate that the top of the knoll is nearly level and that there is another fairly level area immediately to the southwest and about a foot lower. The ground slopes relatively steeply from these areas to the south and west. The extension of the 22-foot contour toward the southwest appears to be due partly to the thickness of the layer of shells and partly to dirt thrown out from the numerous pits just to the northeast.

As shown on the profiles (Fig. 17), the usual section consisted of an upper zone of brown clay (including the sod), an intermediate zone of trampled shells mixed with brown clay, a lower zone of brown clay, and underlying compact clay of a tan color. At a depth of from 8 to 18 cm. below the top of the layer, this clay became darker and greenish-brown in color. Presumably this change of color came about as a result of processes which form a soil profile.

The layer of brown clay, including the sod and shells, averaged about

23 cm. in thickness. It was a little thinner on top of the knoll and a little thicker on the sides. The layer of shells reached a maximum thickness of 18 cm. on the slope, while on top of the knoll (Fig. 16, northeastern portion of excavated area) this dimension did not exceed 9 cm. The lower zone of brown clay, between the layer of shells and the compact clay, varied in thick-

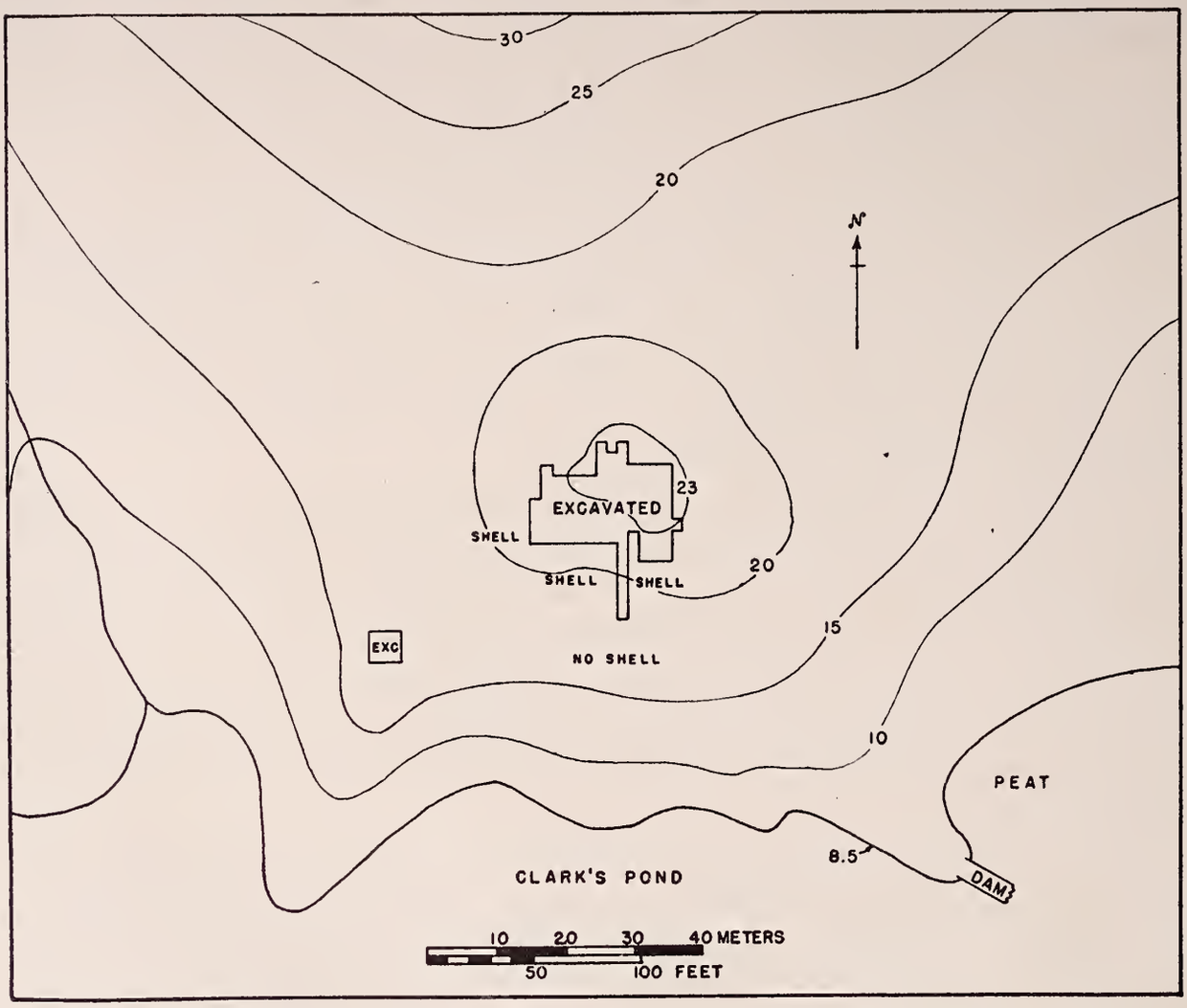

FIG. 15. Map of Clark's Pond Site.

ness from nothing to 5 cm., but was close to 4 cm. thick throughout most of the excavated area.

Inclusions of stones and cultural material afford the only differences between the upper and lower zones of brown clay which can be detected over most of the excavated area. Presumably this brown clay contains some sand and organic matter and should be designated loam. Such sand was not present in any noticeable quantity on the knoll. On the southwestern extension of the knoll, in squares 31SB-33SE, sand was clearly mixed with the clay. In the

southwestern portion of the main excavated area, the brown clay below the layer of shells was heavily impregnated with charcoal (Fig. 17, A and E).

Many small cobbles, more or less decayed, were scattered in the shells. They were heavily concentrated in the brown clay below the shells, and in the very top of the compact clay. Excepting a small area around stake 14J, such stones were not found in any quantity in the brown clay above the shells, nor below the top 5 cm. of the compact clay. Similar stones were found in the same relative vertical position in tests off the site.

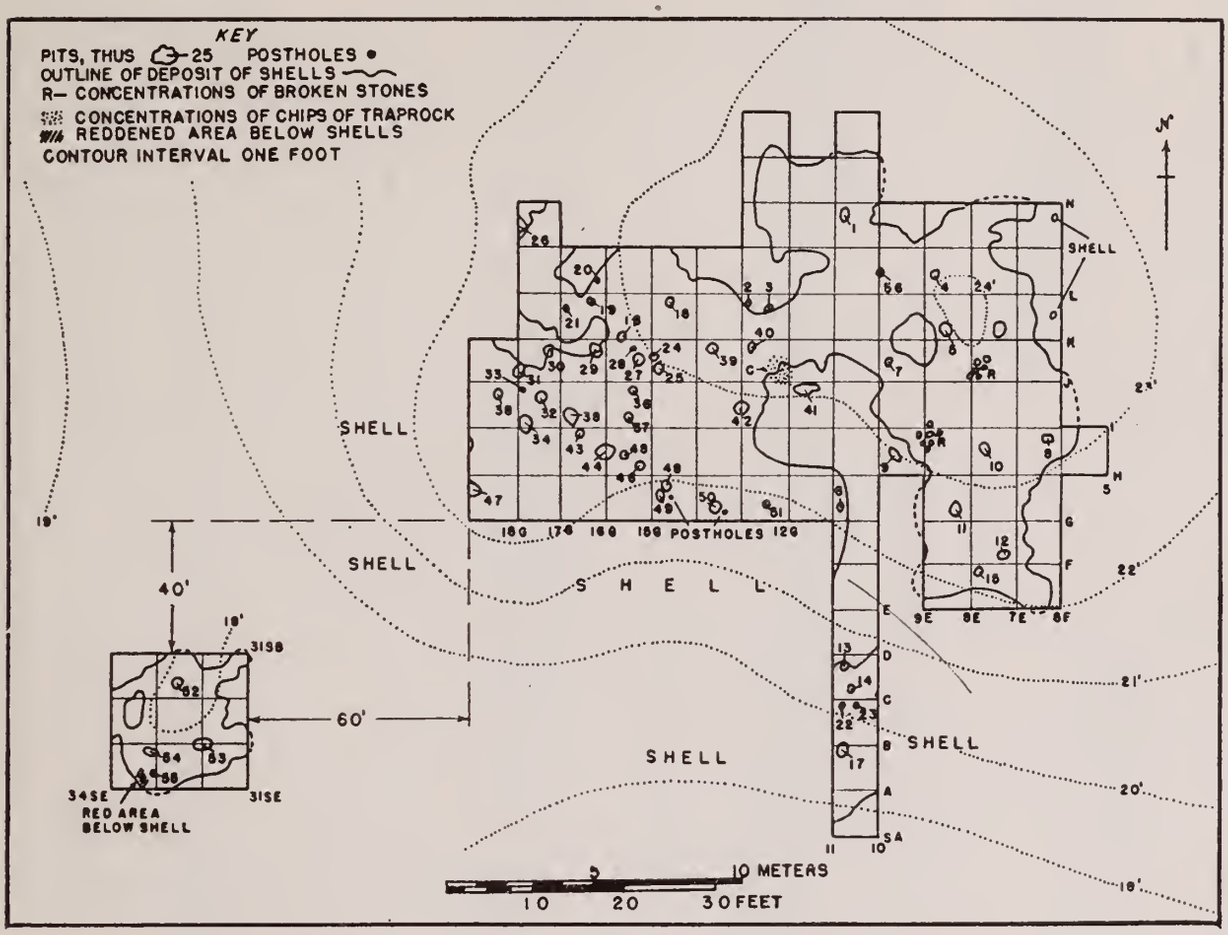

FIG. 16. Clark's Pond Shell Heap: excavation plan.

It will be noticed on the profiles (Fig. 17) that the bases of the deposits of shells appear to follow an old surface, the surface of occupancy upon which shells were dumped. The large number of decayed stones mentioned above suggests that this old surface was a surface of erosion and that the stones were left when the surrounding soil was removed.

A few beach pebbles and cobbles were found in the deposits of shells and in the underlying brown clay. Some of the larger ones were broken but none of them showed evidence of decomposition. Edges of broken stones

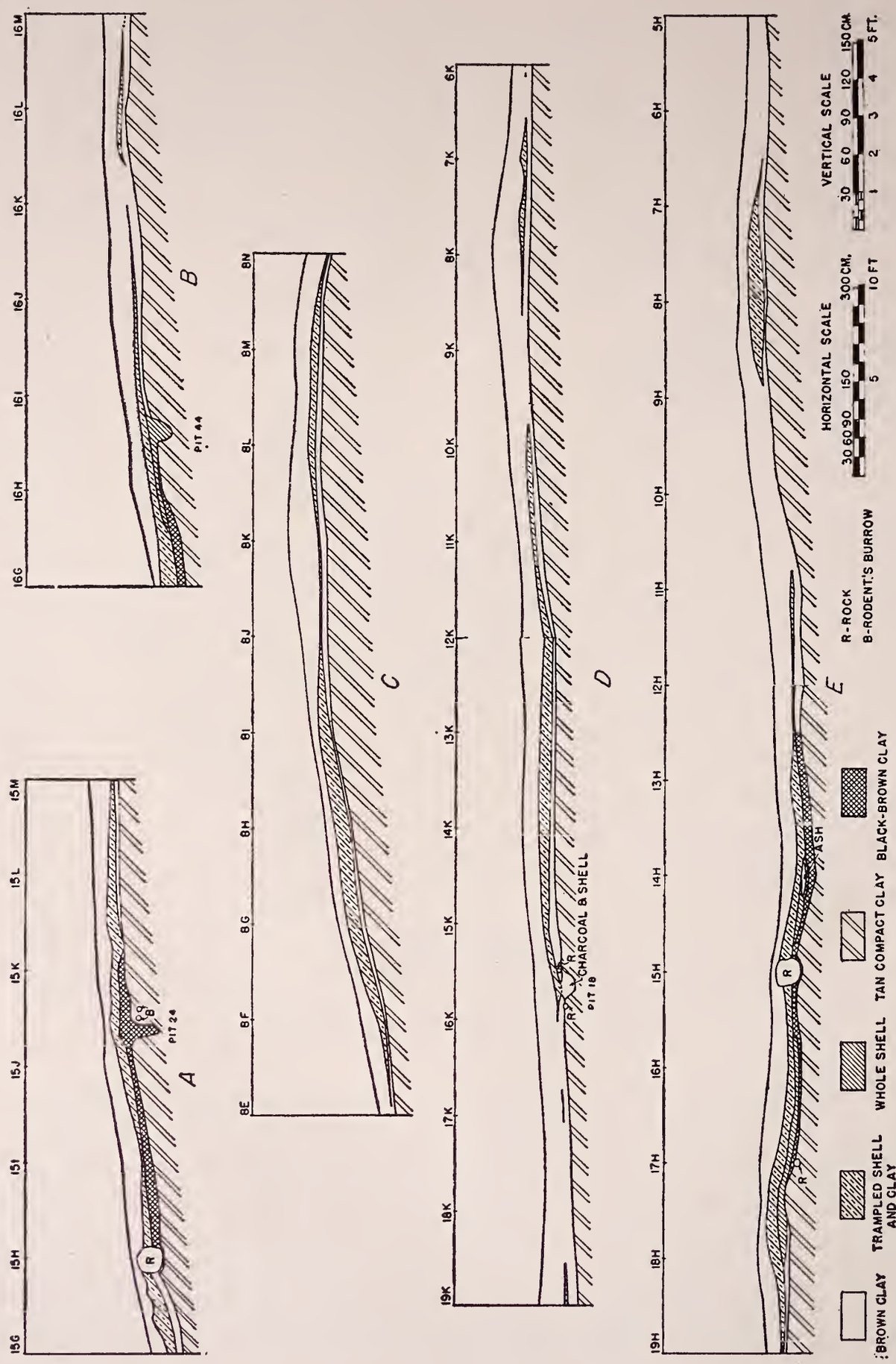

FIG. 17. Clark's Pond Shell Heap: profiles through the deposits; *A*, on 15 line; *B*, on 16 line; *C*, on 8 line; *D*, on K line; *E*, on H line.

were sharp as was the case with artifacts, and their surfaces showed no evidence of decomposition. Presumably they were brought to the site by its inhabitants and are not remnants of an eroded soil.

Concretions were found at the base of layers of shells and below them. Some of these were claystones. Others were sandly limonitic masses. Fragments of decayed hematite were also present.[97] This limonite and hematite could have been used for paint. The presence of small reddish particles in pottery from this site suggests that possibly the compact clay was used in making vessels.

A few fragments of glass and iron, a fragment of white clay pipe and one of brick, two wooden stakes, two peach stones, a bottle cap, a shot gun shell, and eight nails were found in brown clay above the shells. The nails had square stamped heads and may be dated as after 1820.[98] All of this material was post-Indian and none of it was associated with deposits of shells. Probably most of these items came from a shack which is supposed to have been built at or near the site a long time ago. Only two Indian artifacts were found in the brown clay above the shells.

Also associated with post-Indian use of the land was a boulder, 50 cm. in diameter, found between stakes 9I and 9J. Apparently this boulder had been set in sand, as sand was found under it and extending beyond it for a distance of 60 cm., in the upper 13 cm. of brown clay and sod. That this event postdated the shell heap was evident from the fact that a thin layer of shells extended beneath it, 9 cm. below the base of the sand.

On the south side of the boulder and extending beneath it, but entirely below the shell, was a pile of whole and broken cobbles, the largest 20 cm. in maximum diameter, mixed with brown clay. The pile, which was 30 cm. thick at the center, covered an area measuring about 85 × 115 cm. The deposit was otherwise sterile. This feature is shown on the excavation plan (Fig. 16) around stake 9I. Apparently Indians dumped rocks into a hole, possibly an animal burrow, either to get rid of them or to fill the hole.

Surfaces of shell deposits were irregular. In places it was possible to distinguish what appeared to be piles of shells (Fig. 17, A, between 15G and 15H). Bases of deposits of shell were also irregular but they were less so than the surfaces. Definition of the base of the shells was sometimes difficult. Occasionally fragments of shell were found in brown clay below shells. While the level of the surface of compact clay sometimes varied by 2.5 or 5 cm. over

[97] Identified by Mr. E. C. Weaver, Phillips Academy, Andover, Mass.
[98] Mercer, 1929, pp. 235-247.

a short distance, the surface was clearly defined. In a few places, old animal burrows in the compact clay were marked by fragments of shell. Such deposits were always sterile.

Shell deposits on top of the knoll were composed of a mixture of crushed shells, presumably trampled, and brown clay. Near the base of deposits which were thick enough to afford protection against trampling were a few unbroken shells. In the sloping southwestern part of the main excavated area, a lower stratum of whole shells could be seen, but there was no clear division between it and higher trampled shells (Fig. 17, B and E). In square 17H, part of this whole shell deposit overlay crushed shells. The whole shells formed a fairly "clean" deposit with relatively little admixture of brown clay; they were practically devoid of artifacts.

Outlines of shell deposits which have been plotted on the excavation plan (Fig. 17) follow very thin edges beyond which only scattered shells could be found. The shape of the outlines suggests that the deposit grew as the result of the enlargement and spreading of individual piles of shells. Although excavation revealed a continuous deposit, its shape and waxing and waning in thickness afford clues by which it may be broken up into what seem to have been originally five or six separate piles.

The horizontal distribution of worked bone showed an extremely high correlation with thickness of the layer of shells. Occasionally food bones were found *below* thin shell layers but no bone tool was found where the layer was thin nor was any bone found where shells were not present. To ascertain the acidity of the soil as a possible factor limiting preservation of bone, soil samples were taken and tested with the following results:[99]

	pH
Brown clay, just north of site	5.9
Brown clay above thin shell	6.0
Brown clay which contained thin shell	6.2
Top of compact clay below thin shell	6.6
Base of mixture of brown clay, charcoal, and shell (about five inches thick)	6.5

The lower numerical values are the more acid. The neutral point on the scale is 7. Ritchie has presented data suggesting that bone will not be preserved in soil which is more acid than that having a pH value of 6.3.[100] Our tests would seem to agree with those published by Ritchie, although we have no way of knowing whether bone was ever present where not found. It appears possible that until a thin layer of shells has been eaten away by ground

[99] Tested by Mr. E. C. Weaver and Mrs. J. R. Gallagher, Phillips Academy, Andover, Mass.
[100] Ritchie, 1940, p. 10.

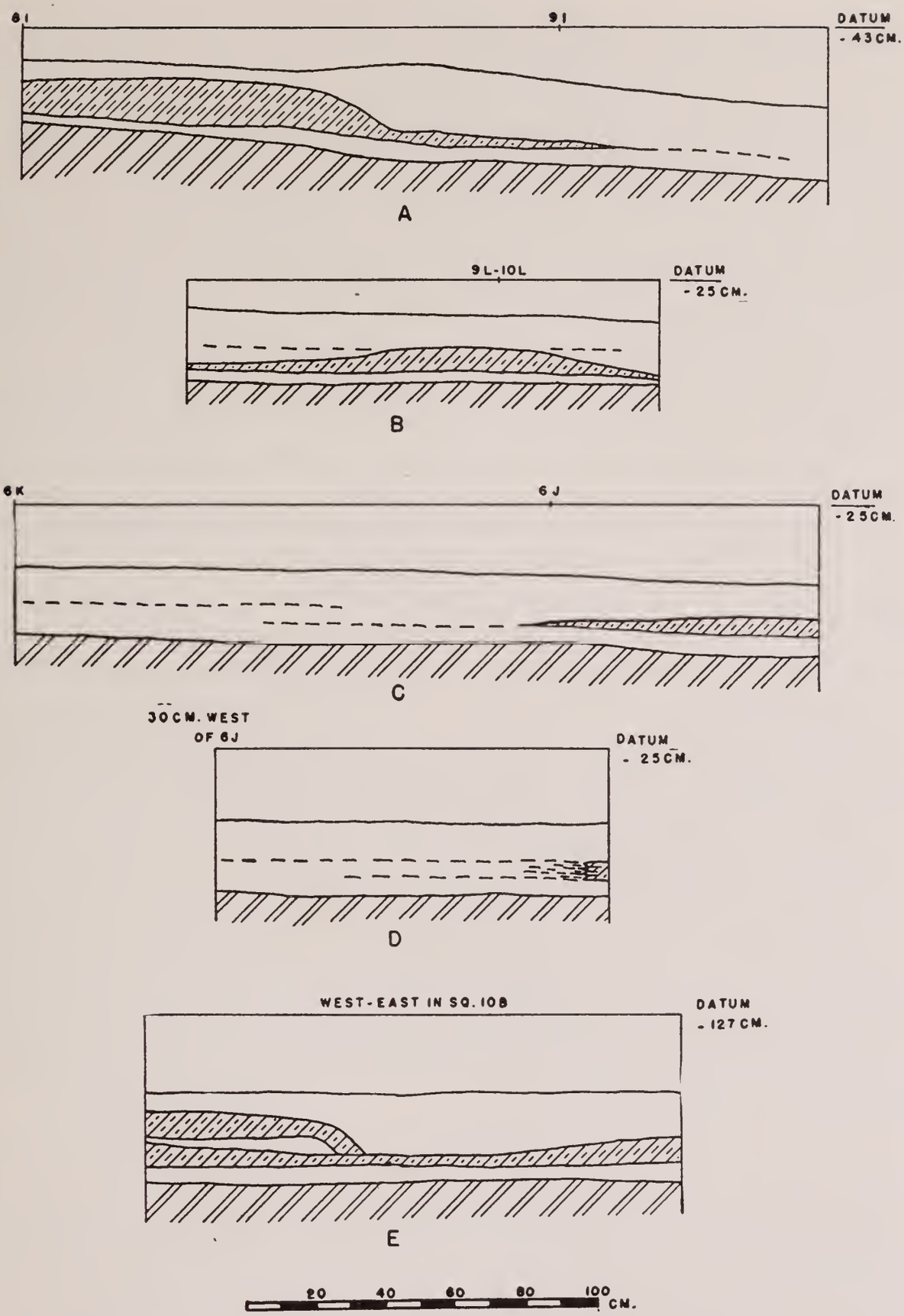

FIG. 18. Clark's Pond Shell Heap: cross sections of edges of shell deposits.

acids, it will neutralize the soil sufficiently to protect bone which is below it from similar destruction.

It will be noticed that profiles of shell deposits (Fig. 17) usually taper out to a thin line, and that the upper surfaces of the deposits slope downward toward the edges to meet the relatively even bottom. Certain sections have been plotted (Fig. 18) to show differences in the observed edges of layers of shells. The right hand side of Figure 18, *C*, is typical of the edge of thin deposits which frequently become a line of single shells. Figure 18, *A*, illustrates the typical edge of a thicker deposit. It seems likely that such scattering at the edges of deposits could occur as a result of people walking over piles of shells.

In Figure 18, *B*, a line of individual shells is shown extending from the top of a deposit. Such distribution could only have occurred after brown clay had covered most of this heap. This line of shells, together with objects of White manufacture which, as has been already stated, were found in brown clay above shell, might be taken as evidence of cultivation. The shells in question lay only 10 cm. below the present top of the sod. In some places shell was found within 5 cm. of the present surface. Cultivation, if ever practiced at this site, did not affect it archaeologically. Such scattering of shell from the top of a heap may have been done by the last Indian at the site or by other forces after abandonment.

An unsuccessful attempt was made to use these thin extensions of shell layers to establish a sequence of shell deposits. The higher line of shells shown in Figure 18, *C*, did not come from the base of another shell heap, as shown in *D*. No overlapping of shell deposits could be proven.

The content of industrial products of the layers of shells on the slopes was substantially less than that of the thinner, more crushed, deposit of shells on the knoll. While worked bone and shell-tempered pottery were present in fair quantities, stone specimens dropped off in frequency very rapidly south of the "I" line (Fig. 16). The shell deposit on the slopes, which contained a minimum of industrial products, as did that at Treadwell's Island investigated by Robinson, appears to be a typical dump.

Features

Features uncovered during excavation included pits, post holes, a fireplace or area of ash, a workshop or area in which chips were concentrated, and two deposits of rocks.

One of the deposits of rocks, found below shell (Fig. 16, below Stake 9I), has been described. The other (Fig. 16, Square 7J) consisted of broken rocks and pebbles, covering an area measuring approximately 38 × 80 cm., in a

layer of shells which was about 5 cm. thick. Possibly these rocks were "pot-boilers," they certainly were not a hearth, and probably not a pavement.

A great number of chips of trap rock were found in the southeastern part of Square 12J (Fig. 16). Most of these chips were in brown clay south of the shell deposit but many were found on top of and at the base of a very thin layer of shells extending from the north. Many worked fragments and artifacts of trap rock, found in Square 12I and the northern half of Square 11I, helped to define this area as a small workshop.

Under Stake 14H was a large accumulation of ash in a shallow depression, 80 cm. in diameter and 5 cm. thick, scooped out of the layer of whole shell (Fig. 17, *E*). Whole shells capped the ash and separated it from the brown clay which lay below the shell deposit. Here the brown clay below the shell deposit was heavily impregnated with charcoal. The ash was homogeneous, powdery, gray in color, and contained no sizable fragments of charcoal. Apparently a fireplace had been made in the shell layer at this location.

Several small depressions were found in the surface of compact clay. Only two of these, one measuring 5 × 7.5 cm. and the other, 4 × 13 cm., were sufficiently marked to be designated as post holes. These were near pits 49 and 50 (Fig. 16, Squares 13G and 14G).

Pits have been plotted on the excavation plan; their characteristics are summarized below.

Except for those mentioned below, pits were shallow, oval or round basin-shaped depressions scooped out of compact clay. Exceptions are Pit 8, which was rectangular, Pits 9 and 28, which were V-shaped in vertical section, Pits 11, 14, 27, 45, and 46, which were U-shaped in vertical section, and Pit 41, which was asymmetric. Pit 56 was the only one dug through the layer of shell.

Cross sections of Pits 14, 27, and 41 are given in Figure 19, while portions of Pits 18, 24, and 44 are included in profiles in Figure 17. The latter are shown in exaggerated vertical scale.

Pit 14 (Fig. 19) was used as a repository for charcoal. Either this pit was not completely filled when the shell layer was deposited over it or else the contents subsequently settled.

Fill of Pit 27 (Fig. 19) consisted of two parts. The upper V-shaped portion was an extension of black dirt, containing a few shells, found here between the shells and compact clay. Lower fill consisted of sterile compact clay indistinguishable from the surrounding compact clay. A deposit of charcoal, 1 cm. thick, marked the bottom, and an extremely thin film of charcoal which outlined the sides made it clear that the filling of the lower part of this pit could

Summary of Pits

No.	Size in cm.	Depth in Compact clay-cm.	Top of pit	Contents
1	25×37	10	Base of shell layer	Brown clay, shells, chip
2	25×25	12.5	?, no shells	Brown clay
3	18×18	16.5	?, no shells	Brown clay
4	23×23	12.5	Base of shell layer	Brown clay, shells, bone, charcoal
5	50×50	18	Base of shell layer	Brown clay, shells, broken rocks, chip
6	33×33	12.5	Base of shell layer	Black dirt, shells, broken rocks, chip
7	27.5×35	15	Brown clay below shell layer	Black dirt, broken rocks, fragment of simple drill (Pl. XVII, 1)
8	18×27.5 Rectangular	12.5	Brown clay below shell layer	Brown clay, flecks of shell, projectile point (Similar Pl. XVI, 20)
9	40×50	23	?, no shells	Brown clay, some shells, ash, chip, 3 sherds of mineral-tempered pottery
10	30×60	12.5	Shell layer	Shells, charcoal, bone, chips
11	57×65	29	Shell layer	Brown clay, some shells, reddened area, 9×5 cm., on one side of pit
12	33×35	18	Shell layer	Shells, charcoal, bone, fish bones, shell-tempered sherd, chip knife (Pl. XVII, 31)
13	25×25	10	Shell layer	Sea clam shell, ash, charcoal, chip
14	37×37	18	Base of shell layer	Charcoal and black dirt, see Fig. 19
15	33×40	10	Brown clay below shell layer	Brown clay, some shells
16	25×35	12.5	Shell layer	Brown clay, shells
17	40×40	18	Shell layer	Black dirt, charcoal, shells, 18 shell-tempered sherds
18	37×50	37	Shell layer	Charcoal, shells, fish bones
19	25×25	10	Shell layer	Black dirt, shells
20	42×42	12.5	Shell layer	Black dirt, charcoal, shells
21	27×33	12.5	Shell layer	Black dirt, shells, fish bones, chip
22	23×23	9	Shell layer	Charcoal, shells
23	23×23	9	Shell layer	Charcoal, shells
24	23×37	15	Charcoal below shell layer	Charcoal
25	37×40	9	Brown clay below shell layer	Brown clay, some charcoal, shells, plummet (Pl. XVIII, 1)
26	?×60	23	?	May be pit or erosion depression, edge of shells dips into sterile brown clay of depression
27	50×50	33	Brown clay below shell layer	Black dirt, shells, bone, fish bone, chips, see Fig. 19
28	20×30	14	Shell layer	Black dirt, shells
29	37×45	15	Shell layer	Black dirt, shells

Summary of Pits

No.	Size in cm.	Depth in Compact clay-cm.	Top of pit	Contents
30	45×45	15	Shell layer	Black dirt, ash, shells, bone, shell-tempered sherd (Pl. XV, 13)
31	37×50	10	?, no shells	Black dirt, shells, fish bones
32	33×33	19	Shell layer	Black dirt, shells, fish bones, cobbles, triangular point (Pl. XVI, No. 6)
33	25×30	7.5	Shell layer	Shells, chip of chert in top, brown clay in bottom
34	30×73	12.5	Shell layer	Charcoal, shells, bone, fish bones, shell-tempered sherd (Pl. II, 7)
35	45×47.5	12.5	Shell layer	Charcoal, ash, shells, fish bones
36	27.5×27.5	23	Shell layer	Charcoal, ash, shells, bone, five shell-tempered sherds
37	40×45	12.5	Shell layer	Charcoal, ash, shells, fish bones, eight shell-tempered sherds
38	25×25	15	Shell layer	Black dirt, shells
39	40×40	10	Shell layer	Black dirt, shells
40	20×23	15	Shell layer	Black dirt, shells
41	55×96	15	?, no shells	Brown clay, chips. See Fig. 19. For artifacts, see description of this pit below
42	35×35	30	Base of shell layer	Black dirt, shells
43	33×33	10	Base of shell layer	Black dirt, shells, bone, chip, thin shell-tempered sherds
44	42×57.5	15	Shell layer	Whole clam shells
45	30×30	25	Base of shell layer	Black dirt, some shells
46	25×30	15	Shell layer	Brown clay, shells, fish bones
47	?×45	19	Shell layer	Black dirt, shells
48	42×42	20	Brown clay below shell layer	Brown clay, broken rocks
49	40×57.5	12.5	Base of shell layer	Black dirt, shells
50	27.5×27.5	18	Base of shell layer	Black dirt, shells
51	30×30	18	Ash between shells and brown clay	Reddened brown clay and ash
52	35×45	10	Brown clay below shell layer	Brown clay
53	35×70	12.5	Shell layer	Black dirt, charcoal, shell, chip, sherd, fish bones
54	35×35	15	Brown clay below shell layer	Black dirt, broken rocks, shells
55	25×27.5	12.5	Brown clay below shell layer	Black dirt, broken rocks, shells
56	25×25	15	Dug through shells	Brown clay, hafted knife (Pl. XVI, 23)

not have occurred through slumping of the sides. Either Indians cleaned out this pit and put clean clay in it; or else they left it clean, except for a little charcoal on sides and bottom, and the pit was partially filled with clean clay before the Indians again used this part of the site.

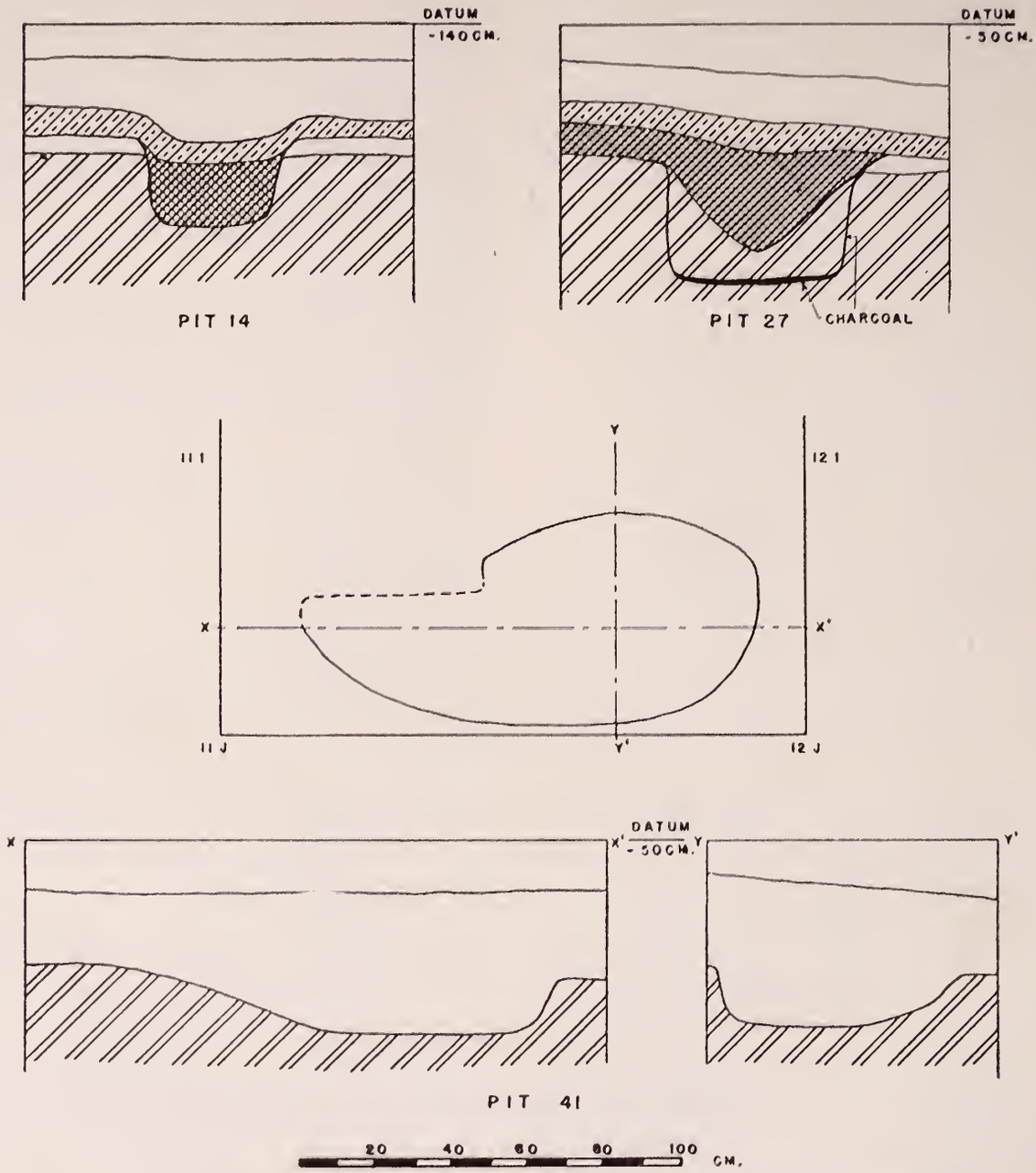

FIG. 19. Clark's Pond Shell Heap: cross sections of Pits 14, 27, and 41.

A plan and two profiles of Pit 41 are given in Figure 19. A dashed line in the drawing indicates that the edge of the pit could not be followed with certainty. This pit was scooped out of compact clay to a depth of 15 cm. Sides towards X′ and Y′ were steep, towards Y, sloping, and towards X, very gradually rising. The pit lay in the northern half of the square. In the half of

the square which contained the pit, the brown clay was dark brown, the usual color for this stratum on the site. In the other half of the square, this member was lighter in color and sterile. As usual, a great many broken and decayed rocks were in the lower part of the brown clay. In and around the pit was a heavy concentration of artifacts and worked fragments. While no shell layer was present in the square (Fig. 16, Square 11I), one or two fragments of shell were found in the top of the pit. Chips of trap rock from the workshop immediately to the northwest, previously mentioned, were also found in this square and in the pit. A few chips of quartz were present as well.

A turtleback (Pl. XVII, 34), a worked fragment of quartz, the tip of a spear point, and a worked fragment of trap rock were found in brown clay around this pit, but only 15 cm. below the surface of the soil. In the brown clay layer at a depth of 22 cm. was a large lanceolate point of felsite. At the division between brown clay and compact clay was a point of quartz with a slightly notched stem (Pl. XVI, similar to 17-18). In the upper part of the pit was a fragment of a snubnosed scraper of quartz, a corner-removed point of quartzite (Pl. XVI, 21), and a rim sherd of shell-tempered pottery (Pl. XV, similar to 7). In the pit were two fragments of a spear point (Pl. XVI, 22), of which the third fragment was found among shells about 10 feet distant, and a notched point (Pl. XVI, 16), both of trap rock.

This was the heaviest concentration of artifacts at the site. From the point of view of stratigraphy, these specimens, except the quartz point, were in an equivocal position, for no layer of shells was found here. The quartz point with slightly notched stem, was located at the very base of brown clay, and must be considered as associated with the early occupation of the site. The only projectile point found in pits dug from the surface of the brown clay below the shell layer (Pit 8) was of the same type. Other specimens taken from pits whose edges could be traced no higher than the brown clay below the shell layer were a plummet (Pl. XVIII, 1) and a fragment of a simple drill (Pl. XVII, 1), of which the other part was found in brown clay below shell about 6 feet distant.

SMALL EXCAVATION

A small excavation in the reasonably level but fairly narrow area about 60 feet to the southwest of the main excavation (Fig. 15 and 16, between stakes 34SE and 31SB) was made in order to test the industrial content of a small area of shell and to determine the relative positions of any sherds which might be found there. This excavation will be described separately; all specimens which were secured are illustrated in Plate XIV.

The vertical section was similar to that which has already been described in the discussion of the main excavation, except that some sand was found mixed with the brown clay. As the excavation progressed, an irregularly shaped deposit of shell, about 4.5 meters across (Fig. 16) was discovered. Its maximum thickness was 5 cm., its surface was irregular, as if several separate piles of shells had been so trampled that they became joined together into one continuous deposit.

Bones of fish and a few bones of the deer were found among the shells. Chips were plentiful both among and below the shells. A few charred nuts were also found. As before, many broken and decayed rocks occurred in the brown clay below the shells. Part of this lower deposit included finely ground, burnt shell. Below the shells was an area about 50 cm. across which was reddened, presumably by heat. Pits uncovered here have been included in the list on pages 110-111.

We list below the particulars concerning depths and numbers of the three classes of sherds which were uncovered:

Type	Illustration	Among Shells	Below Shells
Fine mineral temper, thin walls, globular, textile-paddled, everted rims	Pl. XIV, 1	70	1
Shell temper, medium thick walls, cord(?)-paddled, rounded rims	Pl. XV, similar to 7	38	10
Medium coarse mineral temper, thick walls, plain or straight line decorated surface	Pl. XIV, 7	24	18

This distribution suggests that thin, fine mineral-tempered ware is later than medium thick, shell- or mineral-tempered pottery. This is in agreement with similar suggestions from the main excavation.

The complete inventory of artifacts from this area is illustrated in Plate XIV. No artifacts, except sherds, were found below shell. The thin, triangular fragment of graphite (Pl. XIV, 5) was found in the lower part of the deposit in a place where there were no shells. Other specimens include a triangular arrow point, a tip of a broken point, a small retouched chip, a hone, and a utilized flake (Pl. XIV, 2, 3, 4, 6, 12). A striated cobble (Pl. XIV, 13) was probably used as a rubbing stone or muller. Worked bone includes a thin spatulate tool, sawed bone, scraped bone, and what might perhaps be a bead or button (Pl. XIV, 8, 9, 10, 11). The latter has a slotted hole.

THE COLLECTIONS

COLLECTIONS from Clark's Pond include several divergent pottery wares and a fairly large number of other classes of artifacts which exhibit a wide range of types within some classes. In order to indicate an implied culture change from which a chronology may derive, the description of collections includes references to the location of specimens with respect to shell; whether they were found among shells, at the base of shells, or in the brown clay below shells. Artifacts found at the very base of the brown clay have been included with those found below the shells, even though no shell layer was present. Those found at the same level as, and near the edge of the deposit of shells have been grouped with those found at the base of the shell layer. Specimens found at any great horizontal distance from shell layers have been disregarded because their relationship to shell deposits is not evident.

Such division, implying an early and a late period, makes the assumption that all the area was inhabited before any shells accumulated, and that all deposits of shells are roughly contemporaneous. These assumptions are not necessarily correct. Probably shell accumulated over a period of time. In that case specimens found among the shells in one part of the site might be expected to be contemporaneous with specimens found below the shells in another. Comparisons of specimens found among shells with those found below shells within a rather small area seem desirable, as do comparisons of specimens from the shell deposit of one area with those found below shells in another area.

Due to the small number of specimens per square, meaningful data could not be secured from a study of individual squares. Consequently the excavated area was divided into five sub-areas corresponding to horizontal concentrations of shell (Fig. 16). Study of these sub-areas did not indicate significant differences between sub-areas and the whole in respect to specimens found in shell compared with those found below shell. Therefore the whole of the excavated area is considered as a unit.

POTTERY

Pottery from the Clark's Pond shell heap may be divided into types or classes on the basis of kind of tempering material, shape, surface decoration, and rim treatment. Resultant types are not mutually exclusive, due to some overlapping of traits, but the large number of sherds belonging to certain types of pottery permits definition of modal tendencies. For descriptive purposes, sherds have been grouped according to kinds of tempering material.

Coarse Mineral-Tempered Pottery

Temper is crushed granite, abundant, 5 mm. in greatest dimension; walls thick, 9 mm.; surface hardness 2-3, Moh's scale; color Light Cinnamon Drab;[101] coils 1 cm. wide. Surface is decorated, both inside and outside, with impressions of cord- or textile-wrapped paddles. In New York State this type of pottery is designated as Vinette 1 by Ritchie.[102]

Only three sherds of this type were found. Unfortunately they were not recognized in the field and their provenience within the site is unknown. It was found in the lowest pottery-bearing zones of sites in the Shawsheen River Valley, twenty miles west of Ipswich.[103] The three sherds from the Clark's Pond shell heap differ from those found in the Shawsheen Valley only in that their surfaces are a little softer. On the basis of evidence from the Shawsheen Valley, this type of pottery should be the earliest at Clark's Pond but evidence from the site to support such a view is not available.

Medium Coarse Mineral-Tempered Pottery

Temper is crushed quartz or crushed granite, abundant, usual size 2 mm.; walls thick, 5-11 mm., usual 8-9 mm.; surface hardness 3-4, usual 3; color Light Drab, Drab, Avellaneous, Hair Brown, Wood Brown; coils 1-2 cm. wide. Vessels have nearly straight sides with only very slight constriction of neck and slight eversion of rim. Rims are usually slightly thicker than walls, with a flat, decorated, top surface which slopes downward towards the outside.

Of 850 sherds of this ware, 279 are from vessels having a row of punctate holes approximately 1.5-2.5 cm. below the rim (Pl. XV, 16-19). No rim sherd of medium coarse mineral-tempered pottery was found which did not show these holes. Size of punctate holes varies from vessel to vessel, but all are made with a round, blunt tool, and produce a boss on the inner surface. Five hundred fifty of the remaining sherds, all undecorated, are believed to be from the bodies of such vessels.

Decoration is limited to shoulder, neck, and rim. One vessel, sherds of which are shown in Plate XV, 16, bears a row of punctate holes located between trailed lines, which were made with a triangularly pointed tool. Notches on the rim appear to have been made with the flat side of a tool, while imprints of a six-point rocker are found on the shoulder. This vessel, which probably was about 20 cm. in diameter, is the only one which exhibits chan-

[101] Ridgeway, 1912.
[102] Ritchie, 1946, p. 13.
[103] Bullen, 1946*a*, p. 26; 1946*b*, pp. 38-40.

nelling marks on the interior. On another vessel, punctate holes were made through the impressions of a cord-wound stick. Similar impressions were employed to decorate the rim (Pl. XV, 17). On a third vessel, which probably was about 27 cm. in diameter, rocker imprints were made just below punctate holes and appear to extend toward the base. The rim is notched by the edge and flat side of a tool (Pl. XV, 19). The fourth vessel illustrated is unique in having a double or ridged rim formed by the addition of a fillet on the inside (Pl. XV, 18). Between the rim of this vessel and a row of punctate holes are three parallel lines which appear to have been made by overlapped impressions of a thin, blunt, broad tool.

Minor variations in decorative details—saw-tooth rocker marks, rows of dots, dashes, straight lines (Pl. XIV, 7), and marks of fingernails or curved tools—are found on a few sherds. One such variation consists of vertical lines made with a comb-like tool and located below punctate holes. In the top surface of one rim sherd are small punctate holes. Two or three sherds have a cord-malleated outer surface. Two rim sherds from a small vessel are crudely modeled, have poorly made V-shaped slits in the edge of the rim, and irregularly spaced, carelessly made, punctate holes along the side.

Two body or shoulder sherds of identical medium coarse mineral-tempered paste which were found below the shells bear an entirely different type of decoration. Wavy parallel lines, possibly made with a scallop shell, were used to form a decorative element which cannot be completely worked out or integrated into a design (Pl. XV, 15).

Medium coarse mineral-tempered pottery, predominately punctated, was concentrated in the northwestern sub-area of the excavation at the base of the shell layer. It was divided about equally between the lower portion of the shell deposit and the brown clay which lay beneath it. More punctate rim sherds were found below the shells than among them.

Shell-Tempered Pottery

Of 730 shell-tempered sherds, 213 are unclassifiable fragments. Eight are duplicates, except for tempering material, of thin mineral-tempered pottery to be described shortly. The balance of 509 sherds have walls which are medium thick, 6-8 mm.; a surface hardness of 2-3; their color is Drab or Wood Brown. Rims are sometimes rounded but usually flattened from the top so that they overlap a bit at inner and outer edges.

These 509 sherds may be divided into three groups: The first group, comprising 182 sherds, displays a decorative treatment similar to that of the medium coarse mineral-tempered wares described above. On them, decoration

was achieved by means of imprints of a cord-wound stick, five-point rocker, and punctate holes.

Sherds from a vessel decorated by means of a five-point rocker are illustrated in Plate XV, 12. Its walls are straight. The flat rim is rolled over on the outside. The rocker was applied both horizontally and vertically but the resultant pattern cannot be reconstructed. One vessel, which was decorated with punctate holes, was about 14 cm. in diameter. It has straight sides and a rounded rim which is rolled over a little on the outside (Pl. XV, 14). Between the holes and the rim of this vessel are diagonally applied impressions, each consisting of imprints of six coils of a cord-wound stick. The rim was notched by pairs of similar impressions. A rim sherd from a very small vessel has a row of small punctate holes in its irregular surface below its undecorated flattened rim.

The sherds of shell-tempered pottery, which display traits of decoration similar to that of medium coarse mineral-tempered wares, were distributed vertically in approximately the same way, for they were found chiefly in the brown clay below the shells. Their horizontal distribution was different, for they occurred principally in the southwestern part of the excavation.

Cord-wrapped paddles were applied to the outer surfaces of the second group of shell-tempered sherds, numbering 101. Vessel walls are straight, and impressions of cords parallel the rims. Rims vary; they may be slightly rounded and undecorated (Pl. XV, 8), rounded and smoothed at outer edge (Pl. XV, 7), flat and notched at outer and inner edges (Pl. XV, 6), or flat and indented with the edge of the paddle (Pl. XV, 9). In the latter case, paddled impressions were partially rubbed out but this is not usually the case. Variant forms were notched at the outer edge and impressed on the flat top with a hollow reed (Pl. XV, 11) or were scalloped (Pl. XV, 10).

In vertical distribution, this straight-sided, cord-malleated pottery was confined to the base of the shell layer, approximating the distribution of medium coarse mineral-tempered wares. This pottery, also, was concentrated in the southwestern part of the excavated area.

A third group, consisting of 226 sherds, differs from the above in shape of the vessels and in paddled decoration. Paddle marks were applied diagonally and somewhat smoothed over, partially rubbing them out. Necks of these vessels are constricted, and their rims everted (Pl. XV, 5). Three incised lines are found around the neck. Curvature of the rim suggests that some, at least, are from a large vessel, perhaps 30 cm. in diameter. Sherds are dark Hair Brown in color and appear to have been fired in a reducing atmosphere. Evidence of coiling is not present.

All sherds of this type of pottery were found among shells. Most were situated relatively high in this layer; none were below the shells. The majority of these sherds came from Squares 7H and 7I. At the same depth, among the shells in adjacent Squares 6H and 6I, were fragments of a European pipestem (Pl. XX, 9). This pottery seems to have been a relatively late form which probably was in use in proto-historic times.

Fine Mineral-Tempered Pottery

Two forms of pottery tempered with finely ground rock were found: one, which was globular in shape, with extremely thin walls, was represented by 240 sherds; the other was thick and bore incised designs. Only 24 sherds of the latter form were found.

Temper of the former is probably mica-schist, if one may judge from the large amount of mica which is present. Grains of temper are small, usually less than 1 mm. in diameter. Sherds of these vessels have walls 2-5 mm., usually 3 mm., thick; surface hardness, 2-3; color, Wood Brown to Chaetura Black. Pottery was fired in a reducing atmosphere. Evidence of coiling is not present. Vessels were small, about 11 cm. in diameter; they were globular in shape, with constricted necks and everted rims; and probably were about 15 cm. deep. Their bodies were entirely covered with impressions of textile-wrapped paddles, but these marks were partially removed when the vessel was given its final smoothing. Rims are flattened, decorated, and slant downwards towards the outside.

The neck of one vessel is undecorated. The flat top of its rim is impressed with a row of shallow punctate-like holes, while the inner edge of this rim bears notches made with a fingernail(?) and spaced about 2 mm. apart (Pl. XV, 4). Sherds of this vessel were associated with a stemmed point of quartz similar to that shown in Plate XVI, 10. On a second vessel, paddle impressions on the neck have been almost entirely removed and diagonal imprints, apparently made by the edge or end of a wrapped paddle, were applied subsequently (Pl. XIV, 1). The outer edge of the rim of this pot also shows imprints from the edge of a wrapped paddle.

A few sherds of shell-tempered pottery with thin walls and smoothed-over paddle marks indicate that at least one vessel of this type was made with shell as temper.

All of the above thin pottery was found among shells or in places where there were no shells. Pottery of this type was found chiefly in the southeastern and extreme southern portions of the site. Except for six sherds, which may be of this type, none was found below shells.

Thick incised pottery, of which only 24 sherds were found, is tempered with finely ground granite. Grains are less than 1 mm. in diameter. Temper does not seem to be abundant. Walls are thick, measuring 5-9 mm.; surface hardness is 3; color is Fuscous-Black. It appears that this pottery was fired in a reducing atmosphere. Shapes of vessels made of this ware are difficult to determine. Rim sherds which are illustrated are evidently fragments of a straight rim with points or nodes (Pl. XV, 1). The lower part of this rim bends outward. Neck sherds with a concave outer surface which were found bear almost completely obliterated paddle imprints. It is possible that such sherds are from a globular vessel with straight-sided neck, but there is no evidence to indicate that the pot was a collared one. The incised pattern on the side of the neck or rim may be seen in the illustration (Pl. XV, 1).

All sherds of this vessel were found in the upper part of the shell layer in or around Squares 6I and 7I. Some were associated with a fragment of a decorated octagonal pipe of aboriginal manufacture (Pl. XX, 10) which was found at the same depth as some of these sherds among the shells in Square 6I. Two squares away, both to the north and the south, in Squares 6G and 6K, European brass was found at the same depth as these sherds but in brown clay near the edge of the thin deposit of shells. From this evidence we conclude that the thick incised vessel from which these sherds came was in use at the time of early contacts with whites.

Potters' Clay

Thirteen irregularly shaped fragments of untempered but fired clay were found. These may represent unused potters' clay. Three other fragments are apparently portions of coils. One, tempered with medium coarse particles of crushed granite, has been lapped over another coil but did not adhere (Pl. XV, 3). Another is twisted but apparently never affixed to a vessel (Pl. XV, 2).

Summary of Pottery Distribution

Medium coarse mineral-tempered sherds were concentrated at the base of the shells in the northwestern portion of the excavated area. Shell-tempered pottery, on the other hand, was concentrated south of the "J" line (Fig. 16). It should be noted that 67 percent of the sherds of this ware were found among shells and 33 percent below shells. However, of 239 shell-tempered sherds found below shells, 125 were rocker decorated. The third type of shell-tempered pottery discussed above—that with diagonally applied paddle marks and everted rims—and the finely tempered vessel with incised rim were found around Squares 7H and 7I (Fig. 16) in an upper zone of shell. White

clay pipestems and brass of European origin were found in this area at the same depths as this pottery. Globular vessels with everted rims and thin walls were found on the slopes to the southeast (Fig. 16, D-G lines).

Certain generalizations may be made regarding the sequence of types of pottery at Clark's Pond shell heap. Medium coarse mineral-tempered, punctated wares decorated with impressions of a cord-wound stick, rocker, and trailed or lapped rectilinear patterns; shell tempered pottery with similar decoration; and cord-malleated shell-tempered pottery are relatively early. Relatively late are shell- or fine mineral-tempered vessels of globular shape with definitely everted rims and surfaces which bear the partially smoothed-over impressions of cord- or textile-wrapped paddles. Incised, fine, mineral-tempered ware with noded rim also appears to be late.

PROJECTILE POINTS

Projectile points are illustrated in Plate XVI and their quantity, material, and vertical provenience given in the following tabulation.

PROJECTILE POINTS

	Number	Pl. XVI No.—	Material[a]					Provenience		
			Felsite	Mt. Kineo felsite	Trap	Chert	Quartz	Among shells	Base of shell layer	Below shell layer
Large lanceolate	1	—			1			1		
Large triangular	3	1	2		1			3		
Medium-sized triangular	7	3–6	2	1		2[b]	2[c]	3	4[d]	
Small triangular	3	2	2				1	3		
Elongate, side-notched	1	12	1					1[e]		
Small, corner-notched	3	7–8		1		2		1	2	
Small-stemmed	11	9–11	5				6	1	3	7
Slightly-notched stemmed	11	17–20	4		2		5[f]	2	1	8
Small, wide, side-notched	5	13–14	2[g]		3			1	1	3
Large, wide, side-notched	4	15–16	2[g]	1	1			3	1	
Straight-sided stem, same width as blade	2	—		1	1[h]				1	1
Large straight-sided stem, narrower than blade	3	23–24	1[g]		2			1	1	1
Corner-removed, arrow	2	21	1		1			1[i]	1	
Corner-removed, spear	4	25–26	3		1					4
Elongate spear, rounded stem	2	27		2				1[j]		1
Totals	62							22	15	25

[a] Appreciation is due Dr. Marland P. Billings, Harvard University, Cambridge, Massachusetts, for help in identifying the rocks employed. [b] One of red jasper. [c] Two of quartzite. [d] One from Pit. No. 32.
[e] Polished by wave action or sand-blasting. [f] One of quartzite. [g] Of rhyolite.
[h] Of diabase. [i] Found above shell.
[j] Fragment of point, shorter than XVI, 27, has rounded barbs, surface polished by wave action or sand-blasting.

The above tabulation makes it evident that the concentration of triangular points was at shallower depths than that of small-stemmed points, those with slightly-notched stems, and corner-removed spear points. Medium-sized triangular points were, on the average, found at slightly greater depths than large triangular points.

Wide side-notched points (Pl. XVI, 13-16) were evenly distributed between the layer of shells and the brown clay below the shells. Those below the shells are shorter and relatively broader than those found among shells. All of those wide side-notched specimens may be knives and not projectile points. Their surfaces are smoothed and their tips blunted as if by use. Possibly one of the large straight-stemmed points (Pl. XVI, 23) should be called a knife.

In the Shawsheen River Valley, twenty miles west of Ipswich, the author found evidence of two major archaeological periods. The earlier, pre-ceramic, period was one of transition: during it, the manufacture of corner-removed projectile points gave way to that of small-stemmed and small triangular points. The earliest pottery, cord-malleated on both inner and outer surfaces, appeared just at the end of this period. Large and medium-sized triangular points and a few corner-notched and large lanceolate points were made, but they are typical of the succeeding ceramic period and are ordinarily associated with pottery that is decorated with impressions of cord-wound sticks, or dentate rockers, and, in the late stages, with incised designs.[104]

In spite of the shallowness of the deposit and the small number of points of each type found at Clark's Pond, it may be noted that there is some similarity between the mode of occurrence here and that observed in the Shawsheen Valley. Corner-removed and small-stemmed points, typical of the earlier period in the Shawsheen Valley, were found in greatest numbers below the shell layer while triangular points were most frequently found among shells. Evidence from the Shawsheen Valley suggests that corner-notched points might be found among shells and that points with straight-sided stems might be found below the shells. The evidence from the tabulation is equivocal as far as these forms are concerned, but it may be noted that one point of the latter form was found below the shells and one of the former, among them.

Form and execution of points having a slightly-notched stem have interesting implications. Except for material, these points duplicate in all details points typical of the Lamoka Focus of New York State.[105] These points with slightly notched stems are similar to those designated as small-stemmed points but the

[104] Bullen 1946*a*, *b*, *c*; see also Part I of this paper.

[105] Based upon a comparison with typical Lamoka type points kindly sent me by Dr. W. A. Ritchie. See also Ritchie, 1932, Pl. V, 1-16.

bottom of the stem is wider than its minimum width and peculiar in that the base of the stem does not appear finished (cf. Pl. XVI, 9-11, and 17-20). It will be noted that of a total of eleven points with slightly-notched stems, eight were found below the shells, while one was at the base of the layer and two were among the shells.

Neither points with slightly-notched stems nor the type of wide side-notched point found at Clark's Pond were found in the Shawsheen River Valley.

OTHER CHIPPED TOOLS

Smaller chipped implements, other than projectile points, are illustrated in

MISCELLANEOUS CHIPPED IMPLEMENTS

Type	Number	Pl. XVII No.—	Material						Provenience		
			Felsite	Mt. Kineo felsite	Rhyolite	Trap	Chert	Quartz	Among Shells	Base of shell layer	Below shell layer
Drills											
Simple	1	1	1								1
Elongated	3	2–3	1		1	1				1	2
Expanded base	2	4	1					1	1		1
Wide base	1	5					1		1		
Notched base	5	6–7		2		3			2		3
Knives											
Ovate	2	8	2							1	1
Lanceolate	5	9–10	1			4			2[a]	1	2
Crescentic	1	11				1				1	
Wide trianguloid	2	12	1			1					2
Asym. trianguloid	4	13	4							1	3
Semi-disc	1	35						1	1		
Eared	1	14			1				1		
Hafted	2	15			2					1	1
Stemmed	1	16				1				1	
Scrapers											
Steep end	7	17–19	1			2	2	2	3		4
Thumbnail	20	20–22	2	3	2	3	10[b]		3	6	11
Serrated thumb-nail	1	23	1								1
Large thumb-nail	2	24				1		1			2
Steep-sided	3	25			1			2	1		2
Rectangular	2	26						2	1		1
Triangular	1	27					1			1	
Fragmentary	6	—		1			5		2	2	2
Utilized flakes	6	28–33			1	1	4		2	2	2
Turtlebacks	2	34						2	1		1

[a] One found above shell.
[b] Two are red jasper.

Plate XVII and their quantity, material, and vertical provenience is given in the tabulation on page 123.

A few comments may be made concerning the above tabulation. Simple and elongate drills were found below the shells while drills with a notched stem were evenly divided between the layer of shells and the brown clay below the shells. Asymmetric trianguloid knives, of both the wide and narrow varieties, were found chiefly below shell. Such provenience is consistent with findings in the Shawsheen River Valley where asymmetric trianguloid knives are characteristic of the earlier period. Of forty-two scrapers, ten were found in shell, nine at base of shell, and twenty-three, below shell. Scrapers do not appear to have been as popular in later times at Clark's Pond.

Utilized flakes deserve additional comment. Not illustrated are seven, the edges of which have been modified, either intentionally or by use. They were equally distributed among the strata. The three large flakes which are illustrated in Plate XVII were found among shells or at the base of the shell layer. Of these three, two are retouched on one side of one edge (Pl. XVII, 28, 33, left hand edge); on the third, this retouching has been done on one side of two edges (Pl. XVII, 32).

Three smaller flakes, of yellow and red chert (Pl. XVII, 29-31), were found in a restricted area (Fig. 16, Squares 7F-7H). Two were in brown clay below shell and one in Pit 12, which led down from the shell layer. These flakes are very thin, measuring only 2 mm. in maximum thickness. Two have very fine retouching along one side of the longest, nearly straight edge (Pl. XVII, 30-31, left hand edge). The same retouching is found in the same relative position on the third but it is also retouched on the opposite side, all along the more or less curved end (Pl. XVII, 29, upper end).

LARGE TOOLS

Heavier stone implements are illustrated in Plate XVIII and their quantity and vertical provenience given below.

Various unworked beach pebbles and cobbles as well as disintegrating and broken cobbles were also found. A roughly chipped quarry blank of red felsite and a possible muller complete the inventory of larger stone artifacts. The latter, of disintegrating granite, has a very smooth, slightly concave base and convex top. The periphery has been pecked to produce a shape like that of a flattened ball.

It may be significant to note from the above tabulation that implements presumed to be associated with fishing—plummets and a grooved net sinker—were found in greatest numbers below the shells. Furthermore, the sample,

HEAVIER STONE IMPLEMENTS

	Quantity	Pl. XVIII	Among shells	Provenience Base of shell layer	Below shell layer
Plummets	3	1–3			3
Knob of plummet	1	—		1	
Crude plummet	1	4	1		
Grooved net sinker	1	5			1
Choppers	2	6–7		1	1
Chipped celt	1	8	1		
Pecked, partly polished celt	1	9		1	
Bit of a polished celt or ax	1	10	1		
Sinew stone, both ends grooved	1	11			1
Pecked fragments, one knobbed, one ridged	2	12–13			2
Hoe(?)	1	14	1		
Unfinished adze or gouge	1	15		?—no shell	
Fragments of pestles	2	18	1		1
Anvil stones	2	21	2		
Rubbing stones (striated rocks)	5	16	3	1	1
Hammerstones					
Battered balls	6	19	1	1	4
Pebble hammers	1	20			1
Abraded cobbles	8	—	4	2	2
Core hammer	1	17	1		
Pick-shaped hammer	1	—		1	

although small, testifies to the relatively early use of choppers and sinew stones and the late use of celts.

ARTIFACTS OF BONE

Artifacts of bone and some examples of worked bone are illustrated in Plate XIX. Bone was reduced in size by sawing and splitting (Pl. XIX, 32-33) or by sawing and breaking (Pl. XIX, 26-27, 34-35). Implements were further formed by scraping (Pl. XIX, 12, 29) and finished by grinding or polishing (Pl. XIX, 14-15, 20).

Bone awls (Pl. XIX, 1-6), fragments of spatulate forms (Pl. XIX, 9-11), and fragments of needles (Pl. XIX, 13-14) will be noted in the illustration. Nine other fragments of awls and spatulate forms were found. There is no evidence of a hole in the fragment of a long implement which bears some resemblance to a "snowshoe needle" (Pl. XIX, 15).

One terminal phalange of the deer (Pl. XIX, 12) has been scraped on the outside and socketed at the base to form a projectile point. Such bone points, different from socketed conical bone points, are seldom found. I do not know of others from New England. Ritchie illustrated one from the Wickham site,[106]

[106] Ritchie, 1946, Pl. 9, *54*.

and lists one from Castle Creek,[107] indicating that such forms are associated with Owasco sites in New York State.

All five barbed bone points (Pl. XIX, 16-20) came from the southwestern part of the excavated area where fish bones were very common. Unfortunately the bases of the multi-barbed points are missing so that it is impossible to tell whether they were points for spears, harpoons, or leisters. Single-barbed bone points show two different types of bases. In the first (Pl. XIX, 19) the base was made by sawing transversely and then breaking. This point could have been lashed at the side to a piece of wood or bone to form a compound fishhook. The other point (Pl. XIX, 20), highly polished and missing part of the barb, has a wedge-shaped base. This is formed by a short facet on the barbed side and a long facet on the other side. The longer facet, which is the more finished of the two, presumedly represents a contact surface for attachement or for lashings.

An antler tine which may have been used as a flaking tool (Pl. XIX, 29) shows only a little evidence of use. Five other fragments of worked antler, including two tips, were found. If the latter were used for chipping stone, hardly any evidence of such use remains on the tool.

Beads (Pl. XIV, 22-25) were made from bird bone. The perforated phalange of a deer (Pl. XIX, 28) has a smaller hole on the side opposite that shown in the illustration. Whether these holes were made for marrow extraction, or to string the bone as a bead, is not known.

Two small pieces of worked bone (Pl. XIX, 26-27) may be gaming pieces. They have been sawed and broken to length. One side of each bears parallel incised lines.

Three worked beaver incisors (Pl. XIX, 30-31) complete the inventory of bone tools.

ORNAMENTS

Articles for personal adornment include three copper beads (Pl. XX, 1-3), four beads of bird bone (Pl. XX, 22-25), one of shell (Pl. XX, 17), and one of clay (Pl. XX, 18). The latter is tempered with shell.

The trianguloid pendant of steatite shown in Plate XX, 16, is decorated with notches along the sides. Between holes on one side is a groove for a supporting cord.

A drilled pendant (Pl. XX, 19) was found at the base of the shell layer; what may be part of a gorget (Pl. XX, 20) was in the upper part of the layer of shells. Both are made of banded slate. Apparently such ornaments

[107] Ritchie, 1944, p. 345.

were made at the site. Three pieces, two of a poor grade of slate (Pl. XX, 21) and the other of black slate (Pl. XX, 22), look as if they might be similarly-shaped artifacts in process of manufacture.

A fragment of graphite is illustrated in Plate XX, 23. Facets have been ground on it, perhaps in the process of making paint. As mentioned earlier, limonitic concretions and decayed hematite were also found at the site and they, too, may have been used for paint.

A drilled fragment, from the rim of a steatite vessel (Pl. XX, 24) was found at a depth of 17 cm. in Square 12L where no shell was present. It is not possible to determine whether it had been used as an ornament. However, no other fragments of a steatite vessel were found.

SMOKING PIPES

Smoking was a well established trait among the people who lived at the Clark's Pond Shell heap. Fragments from bowls of five aboriginal pipes, a fragment of the stem of one, and four fragments of European pipe stems were found.

The latter (Pl. XX, 7-9) were all found among shells in the eastern part of the excavated area at a depth of 15 cm. below the surface. This is in the same area and at the same depth as pottery which is incised (Pl. XV, 1) and that which has a flaring rim, diagonal paddle marks, and incised horizontal lines around the neck (Pl. XV, 5). Part of one of these pipe stems is brownish-red in color. No fragments of white clay pipe bowls were found.

Also associated with the incised pottery, somewhat shallower than one of the European pipe stems and therefore relatively late, was a fragment of an aboriginal pipe with a decorated bowl, the upper part of which was either hexagonal or octagonal (Pl. XX, 10). In the illustration, a division of the decorated panel along a diagonal is quite noticeable. This was effected by means of a change in the direction from which the corner of a tool with a somewhat wedge-shaped end was applied to the clay. The side panels are identical, but differ from the front panel which is the one illustrated. Toward the top, or mouth of the bowl, the tool has been applied squarely to the side panels in order to produce five lines parallel with the rim. Toward the heel, the corner of the tool has been used to form three parallel lines. A fragment of crudely octagonal pipe stem (Pl. XX, 11), found thirty feet away, may perhaps be from this pipe.

Of three other clay pipe bowl fragments, one (Pl. XX, 14) is undecorated. A second (Pl. XX, 13) has a thickened rim and is decorated by fine incised lines. In the illustration, only the more-or-less vertical lines, forming triangles,

can be seen, but this specimen also has seven fine lines parallel to the rim. The rim and decoration on this fragment are similar to that on a pipe from Castle Creek, an Owasco site in New York.[108]

A third pipe bowl (Pl. XX, 12) is decorated by thirteen shallow incised lines parallel to the rim. The inside of this bowl has some black, carbonized material adhering to the wall. Pipes with this form of decoration were in use at the time of early European contact in eastern Massachusetts. One was found with a metal brazier and beads of bone and white glass in a grave at Ipswich.[109] The lines around the latter pipe are incised, shallow, and 9-11 in number, depending on where they are counted.[110] Pipe bowls with similar decoration were found at Canandaigua, which is also an Owasco site in New York State.[111]

A square pipe bowl (Pl. XX, 15), which is made of steatite, is decorated with a false rim, formed by incising a groove below the edge of the lip. The inside of this bowl has longitudinal grooves left from the manufacturing process.

ARTIFACTS OF METAL

Seven metal objects were found, at a depth of 15-18 cm. among or near shells in the eastern part of the excavated area. These include three rolled copper beads (Pl. XX, 1-3), a bent disc (Pl. XX, 4), two knife(?) blades (Pl. XX, 5-6), and a thin, flat fragment, measuring 12 × 4 mm. Spectrographic analysis of four of these fragments is given below.[112]

		Spectrographic Analysis			
Specimen	Pl. XX	Constituent	Large Amount	Trace	Very Slight Trace
Bead	3	Cu	Si	Ag, Mg, Al, Fe	–
Disc	4	Cu	Si	Ag, Ni, Al	Sn
Narrow blade	5	Cu, Zn	Si	Ag, Ni, Al, Bi	Sn
Wide blade	6	Cu, Zn, Sn	Si	Ag, Ni, Al, Bi, Pb, Fe	–

Presence in all analyses of silicon and aluminum may be accounted for by infiltration of these elements into voids in the metal during burial in the ground.[113] In the case of native copper it may also be the result of its having

[108] Ritchie, 1934, Pl. 14, *16*.
[109] Willoughby, 1924, pp. 21-22.
[110] Willoughby, 1935, p. 182, Fig. 104b.
[111] Ritchie, 1936, p. 13, *9-10*.
[112] Appreciation is due Miss Mary Striga of the General Plate Division of Metals and Controls Corporation, Attleboro, Mass., who very kindly made the spectrographic analysis.
[113] For a discussion of this point see "Analysis of Copper Beads from Indian Grave,

been worked cold, and with stone tools. The constituents of the bead, pure copper with traces of silver and iron as impurities, agree with elements revealed by chemical analysis of Lake Superior copper,[114] except for the trace of magnesium. The two unanalyzed beads are of similar material to judge from megascopic examination. They scratch to the same color, and are similarly made. There seems to be no reason for not accepting these three beads as made of native copper.

The presence of nickel and a very slight trace of tin in the disc is probably sufficient to establish it as of European copper. The two blades, in which zinc is a constituent, are brass and of European origin. The unanalyzed thin, flat fragment scratches to a yellow surface as do the blades.

Only one of the copper beads was found near a European pipe stem or fragment of brass. It was 2.5 cm. deeper than European objects in the same and in two adjacent squares. It seems safe, however, to assume that these native copper beads were in use at Clark's Pond at time of early contact with Europeans, possibly in a manner similar to that recorded by Rosier, who says of two little Indian boys seen near St. George's Harbor, Maine: "they had two little male children of a yeere and half old, as we judged, . . . , all naked, except their legs, which were covered with leather buskins tewed, fastened with strops to a girdle about their waste, which they girde very straight, and is decked round about with little round pieces of red Copper."[115]

These objects of metal were all found in the same area and at depths equivalent to those of European pipe stems and sherds of the incised and the globular vessels mentioned earlier.

FOOD REMAINS

Mollusca[116]

Common or soft shell clam—*Mya arenaria* L.
Sea clam—*Spisula solidissima* Dill.
Black quahog—*Cyprina islandica* L.
Blue mussel—*Mytilus edulis* L.
Ten-ribbed whelk—*Neptunia decemcostata* Say

Holyoke, Massachusetts.", *Bulletin of the Massachusetts Archaeological Society*, Vol. III, No. 2, p. 18.

[114] West, 1929, p. 109.

[115] Rosier, in Burrage, 1906, p. 373.

[116] Identified by Mr. William Clench, Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

Marine snails—*Polinices heros* Say
—*Nassarius obsoletus* Say
—*Thais lapillus* L.
—*Symnaea polustris* Say (?)
Land snails—*Mesodon albolabris* Say
—*Mesodon thyroides* Say
—*Anguispira alternata* Say

Reptilia[117]

Turtle—*Pseudemys rubriventris bangsi* Babcock

Pisces

Sturgeon—*Acipenser*
Cod family—Common cod, *Gadus morrhua*, or hake, *Urophycis*
Other unidentified fish bones

Aves[118]

Great auk—*Plautus impennis*
Loon—*Gavia immer*
Wild turkey—*Meleagris gallopavo*
Other unidentified bird bones

Mammalia[119]

Virginia deer—*Odocoileus virginianus borealis*
Indian dog—*Canis familiaris*
Harbor seal—*Phoca vitulina*
Beaver—*Castor canadensis*
Raccoon—*Procyon lotor*
Otter—*Lutra canadensis*
Gray squirrel—*Sciurus carolinensis leucotis*
Hare—*Lepus americanus virginianus*
Black bear—*Euarctos americanus*
Moose—*Alces americanus*

Plant Food

Charred nuts—probably pignut hickory

[117] Identified by Dr. H. Loveridge, Museum of Comparative Zoology, Harvard University, Cambridge, Mass.
[118] Identified with the assistance of Dr. J. L. Peters, Museum of Comparative Zoology, Harvard University, Cambridge, Mass.
[119] Identified with the assistance of Barbara Lawrence, Associate Curator of Mammals, Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

The list of mollusks does not include the oyster. This may reflect the location of the site on Plum Island Sound. Sites at Eagle Hill[120] and Treadwell Island,[121] where oyster shells were found, are located further inland. There the water would be slightly warmer, and in the case of Treadwell's Island less salt (Fig. 14).

All mollusks listed are edible. Shells of the common clam comprised probably 80 percent of the shells in the heap. Shells of sea clams were a poor second, while those of the quahog and the mussel were rare. As the ten-ribbed whelk is a deep sea variety, it probably was not a source of food. It may have been cast upon the beach by a storm as an empty shell and taken to the site by the finder.

Of marine snails, *polinices heros* and *nassarius obsoletus* were fairly abundant. Over 50 of each were collected. Practically all of the former have the lip of the shell broken off to gain access to the animal. About half of the latter were found in one square—a meal of mud flat snails.

Of land snails, *mesodon albolabris* were fairly frequent, over 20 were saved and more were discarded. Other land snails were rare. Robinson writes that at Treadwell's Island *mesodon albolabris* shells were found everywhere at the base of the heap.[122] It may be that these snails crawl under shell heaps, as has been thought, but it is also possible that Indians collected them for their food value.

Striations on the inside of fragments of turtle shell may have been made either during removal of the flesh or in the course of the preparation of the carapace for some use.

As has been stated, the remains of fish were fairly common. While the number of individual fish may not be significant, over 30 large fish—either cod or hake, identification was difficult on the basis of skeletons available for comparison—can be accounted for by the presence of more than 60 ear bones.

The number of bones of the great auk seems large. The identication of three auks, compared with the number of individual mammals, suggests that this bird was an important and not too rare item of Indian diet.

Among mammals, bones of the deer are by far the most common, followed by those of the dog, harbor seal, and beaver. A minimum of 8 deer may be counted. The moose is represented by only one bone, and the bear by one tooth.

Without exception, long bones of mammals were split for extraction of

[120] Wyman, 1867.
[121] Robinson, 1882.
[122] *Ibid.*

marrow. It appears that the ends of bird bones were broken off and the marrow sucked out. Fragments of crushed skulls suggest that brains were eaten or possibly used for tanning skins. Variations in the degree of closure of the epiphyses show that both old and young animals were taken.

DISCUSSION AND COMPARISONS

VERTICAL distribution of artifacts at the site at Clark's Pond has been indicated under sections dealing with their description. This data is summarized and compared with that from four sites in the Shawsheen River Valley, twenty miles west of Great Neck, in the following tabulation.

Clark's Pond Site	Shawsheen River Sites
Late Ceramic	Late Ceramic
European objects	European objects
Fine mineral-tempered pottery: incised designs; noded rims	Fine mineral-tempered pottery: incised designs, noded collars
Fine mineral- and shell-tempered pottery: globular; everted rims; smoothed-over paddled imprints.	
Smoking pipes	
Large lanceolate points	Large lanceolate points
Large triangular points	Large triangular points
Intermediate Ceramic	Intermediate Ceramic
Shell- and mineral-tempered pottery: flat or rounded rims; slight suggestion of neck or straight sided: decoration, impressions of cord-wound stick, rocker, trailed lines, some plus punctuate holes, or cord-paddled surface.	Vegetable-tempered pottery: slight suggestion of neck, flat rims, cord-wound stick imprints
Small- and medium-sized triangular points	Large- and medium-sized triangular points
Corner-notched points	
Wide side-notched points	
Thumb-nail scrapers	
	Early Ceramic
	Mineral-tempered pottery: rounded rims, rocker and trailed line decoration
	Corner-notched points
	First Pottery
	Coarse mineral-tempered: rounded rims, straight sides, cord-paddled inner and outer surfaces
	Points with wide notches at sides
	Small triangular points
	Small stemmed points
Early	Early Pre-ceramic
Thumb-nail scrapers	
Plummets	
Asymmetric trianguloid knives	Asymmetric trianguloid knives
Points with "slightly notched" stems	
Small-stemmed points	Small-stemmed points
Corner-removed spear points	
	Small triangular points
	Earliest
	Thumb-nail scrapers (one site only)
	Corner-removed arrow points
	Corner-removed spear points

Traits found at Clark's Pond but absent in the Shawsheen Valley include pipes, globular vessels, wide side-notched points, and points with slightly-notched stems. If we omit them, we observe a reasonable similarity between the sequence of forms of projectile points found in both areas. The same is true to a lesser extent as far as pottery is concerned. In Part One of this paper I have discussed my reconstruction of chronology based on shapes of projectile points and types of pottery found in eastern Massachusetts;[123] here, I wish merely to point out the fact that the Clark's Pond Shell heap is another site at which similar evidence may be observed.

Comparison of specimens from Clark's Pond with those from nearby Neck Creek, Eagle Hill, and Treadwell's Island (Fig. XIV) indicates that, with minor exceptions, all traits from these three sites were present at Clark's Pond.[124] Traits found at Eagle Hill and not at the other three sites include spoons of porpoise jaw and a bone tool with a saw-like edge. Decoration on bone was found only at Eagle Hill and Neck Creek. Remains of animals and fish used for food were similar. At Treadwell's Island, as at Clark's Pond, plummets and large quantities of the remains of fish were found relatively deep in the deposit. Because incised or thin-walled pottery, pipes, and corner-notched points were not found at Eagle Hill and Treadwell's Island, and because triangular points were not very plentiful at these sites either, we may conclude that these sites were not inhabited at as late a period as was the site at Clark's Pond. The Neck Creek Shell heap appears to represent a very brief temporal period when triangular points and flat-rimmed pottery were made.

Traits common to these four sites, or to at least two of them, are standard traits that are found almost universally throughout southern New England, if not throughout New England as a whole. These traits include triangular, small-stemmed, and corner-removed projectile points; pebble hammerstones; notched and grooved sinkers, plummets; celts; gouges; pestles; worked bone in the form of awls and spatulate objects; and mineral- and shell-tempered pottery with flat or rounded rims and nearly straight sides, decorated with impressions of cord-wound sticks, rockers, and various kinds of trailed and dashed lines.

Clark's Pond Shell heap differs radically from the other three sites, from sites in the Shawsheen Valley, and from many sites in southern New England in that the inventory of artifacts includes European trade goods; smoking pipes; pendants; punctated, incised, and thin globular pottery; certain forms of

[123] See also Bullen, 1946*a*, *b*, *c*.

[124] The courtesy of permitting examination of specimens from Eagle Hill and Treadwell's Island, kindly extended by the Peabody Museum, Salem, Massachusetts, is appreciated.

projectile points; and a large quantity of scrapers. Some of these traits are of northern derivation while others suggest influences from the west.

Certain traits, such as chips and implements of Mt. Kineo felsite, and an elongate spear point with curved stem seem to indicate influences from Maine. Other traits, while not entirely restricted to the north, are much more common in Maine than in southern New England. Such traits include pottery with large punctates, wide side-notched points of a certain type, and points with slightly-notched stems. The following brief survey attempts to explore the distribution of these traits between northern and southern New England.

The similarity between the points with slightly-notched stems and those found at Lamoka Lake in New York has been mentioned. This type of point was also found at Vergennes, Vermont, to judge from Bailey's illustration.[125] Wendell Hadlock, of the Abbe Museum, Bar Harbor, Maine, assures me that this type is found in the shell heaps of Maine. They are included among his "straight stemmed" points which at Taft's Point he found only in the black humus or lowest zone (below shells).[126] In this same lowest zone were fifty-nine of the sixty plummets found at that site. This situation has parallels with that at Clark's Pond where the majority of these points and three of the four plummets were found below shell. At both sites, wide, side-notched points were found in shell and below shell. In contrast with conditions observed by Hadlock at Taft's Point, however, pottery was found below shells at Clark's Pond.

Many of the small-stemmed points of quartz, common in southern New England, approach the type under discussion but I know of only isolated examples with the slight lateral expansion and "unfinished" appearance of the bottom of the stem which is typical of specimens of points of this form found at Clark's Pond. What appears to be a similar point is illustrated by Robbins among specimens from the Faulkner Spring site in Norton, Massachusetts.[127] Several points from the Basto site, at South Woodstock, Connecticut, tentatively identified from the illustration, may be of this type.[128] From Praus's report it appears that such points came only from "council" pits. At least one Lamoka-like point was found at the Hornblower shell heap on Martha's Vineyard.[129]

Wide points with side notches, similar to specimens from Clark's Pond (Pl.

[125] Bailey, 1939, Pl. 5.
[126] Hadlock, 1939, Pl. 6, *a*, fourth in bottom row, also tabulation p. 25.
[127] Robbins, 1944, Pl. XII, 1.
[128] Praus, 1945, Pl. 4, *3*, *6*, *9*.
[129] Byers and Johnson, 1940, Pl. III, 5.

XVI, 13-16), are found in Maine.[130] They are also found at Vergennes, Vermont,[131] and are typical of the Brewerton and Point Peninsula Foci of New York.[132] A similar but smaller point was found at the Foster's Cove site in Andover, Massachusetts.[133] In southern New England, points displaying the closest similarity in form appear to be among those from the Faulkner Spring site at Norton, Massachusetts, illustrated by Robbins. Of several more-or-less similar points, four closely resemble but are narrower than those under discussion.[134] I do not know of other points from southern New England which closely resemble the wide points with wide side notches which are found at the Clark's Pond shell heap and in Maine. However, the difference between these points and certain side-notched points from southern New England is a fine distinction. What might be considered similar points include two found at the Van Steensburg site, a small site located on a brook tributary to the Ipswich River (cf. Pl. XIII, above), one from Martha's Vineyard,[135] and two from the "council" pits at the Basto site, South Woodstock, Connecticut.[136] Five others are included in the collection made by Delabarre at Grassy Island in southern Massachusetts, if one may judge from pictures of this collection. Irrespective of classificatory problems, points of this type are more common in Maine than in southern New England.

The term "punctate" as used in this report refers to a row of holes punched nearly through the wall of a vessel a short distance below the rim. This decorative treatment is used in addition to other decoration. It is only the addition of these holes that differentiates punctated from otherwise similar pottery of both northern and southern New England.

Punctated pottery is distributed from Maine[137] westerly. It is included in collections from Nova Scotia,[138] The Weirs, New Hampshire, and Isle La Motte in Lake Champlain.[139] Bailey found it at Vergennes, Vermont.[140]

[130] Hadlock, 1939, Pl. 6, *a*, upper middle of illustration; Hadlock, 1941, Fig. 5, *6-7*; Smith, W. B., 1930, p. 11, Fig. 4; also found by Moorehead in Maine shell heaps, Peabody Foundation records.

[131] Bailey, 1939, Pl. V, 46-51, 61, 109.

[132] Ritchie, 1944, Pl. 110, *25, 77, 80, 92-96*; Pl. 115, *56-58, 96, 99*; Pl. 56, *26-27*; Pl. 59, *8, 9, 23-25*.

[133] Bullen, 1946*a*, p. 29, Fig. 9, m.

[134] Robbins, 1944, Pl. X, 3, 8, 11; Pl. XII, 5.

[135] Byers and Johnson, 1940, Pl. III, 44.

[136] Praus, 1945, Pl. 4, *4-5*.

[137] Moorehead, 1922, Fig. 79; Rowe, 1940, Pl. VI.

[138] Smith, H. I., 1929, Pls. X, XI.

[139] Peabody Foundation, records.

[140] Bailey, 1939, Pls. I, VI.

Ritchie reports this trait on Point Peninsula pottery.[141] Punctated pottery is extremely rare in southern New England being reported, to the extent of my knowledge, only for a shell heap at Taylor Hill, Wellfleet, Cape Cod,[142] and at Milford, Connecticut.[143] Pottery with a row of shallow holes, not true punctates, has been found at Seth's Swamp, Wellfleet, Cape Cod,[144] and at the Squam Pond site on Nantucket.[145]

The most specific indication of connections with Maine which was found at Clark's Pond was in the form of chips and artifacts made from Mount Kineo felsite. This porphyritic material is very distinctive. It is characterized by phenocrysts of feldspar and dark quartz, or by craters in surfaces from which phenocrysts have been lost. Its ground mass is greenish-gray in color and it weathers to a white. Specimens and chips of this material from Clark's Pond were compared megascopically with others from Mount Kineo in Maine by Dr. Marland P. Billings of the Department of Geology and Geography, Harvard University, Cambridge. Dr. Billings said that these specimens and chips were all of "lithologically identical material."

Sears made an extensive study of the geology of Essex County, Massachusetts, in which Great Neck is located.[146] Examination of his hand samples, kept as a study collection at the Peabody Museum, Salem, disclosed no felsite similar to that from Mount Kineo, Maine. All lithic materials found at the site were present in Sears collection except yellow chert (jasper) and Mount Kineo felsite. That Sears might have missed an outcrop or any appreciable number of boulders of this material is possible but extremely unlikely as his work was very thorough.

Until another source is found, it may be assumed that this material came either from Mount Kineo in central Maine, or, what is much more likely, from the boulder train which extends southeasterly from that mountain to the sea. At its southern extremity, the western edge of the boulder train intersects the coast line near the west side of the mouth of Penobscot Bay, approximately twenty-five miles east of Pemaquid, Maine, and over a hundred miles to the northeast of Great Neck.[147] It seems impossible to account for the presence of this material at Great Neck without invoking transportation by human agency.

[141] Ritchie, 1946, Pl. 8, *32-33*.
[142] Mr. Howard Torrey, Reading, Massachusetts, personal communication.
[143] Rogers, 1943, Pls. 5, 6.
[144] Torrey, 1946, p. 51, Fig. 26*b*.
[145] Bullen and Brooks, 1947, p. 58, Fig. 22, *a*.
[146] Sears, 1905.
[147] Leavitt and Perkins, 1935, p. 33.

Large chips of this material, on some of which the original surface was preserved, indicate that Kineo felsite was brought to Clark's Pond for the fabrication of tools. This does not imply that all specimens of this material found at Clark's Pond were made there. Some may have been brought from Maine in the finished state. Specimens from Clark's Pond made of this material include an elongate spear point (Pl. XVI, 27), a triangular arrow point (Pl. XVI, 6), two side-notched drills, two thumb-nail scrapers, and other worked fragments. The elongate spear point is the most interesting, as it is of a form commonly found in Maine.[148] I know of no similar specimen from southern New England.

Of the eleven specimens made of Mt. Kineo felsite which were found at Clark's Pond, eight were in the northwestern portion of the excavation, the area in which punctated pottery, a type common in Maine, was also concentrated. These specimens had a vertical distribution comparable to that of the punctated pottery. Six of these eight specimens were found below the shells; one was at the base of the shell layer, and one was in a pit leading down from the shells. It is evident that if this material was brought from Maine, as I believe, contact with the north must have been made relatively early in the history of the site—at least prior to contact with Europeans. It continued into historic times, as will be shown below.

Consideration of the distribution of these various traits—points with slightly-notched stems, wide side-notched points, and punctated pottery—indicates that they occur commonly in Maine and that only occasional finds of similar artifacts have been made in southern New England. The opposite is true of southern traits.

As has been pointed out at various times, New England may be roughly divided into two climatic zones, a northern one where food collecting was the major occupation of the aboriginal inhabitants and a southern one where, in late times at least, agriculture was an important part of the economy. Dixon, in 1914, discussed differences between the languages and archaeological collections of northern as compared with southern New England. He suggested the New Hampshire-Maine boundary as an approximate line of division.[149] Byers, using the environmental approach to this problem, points out that the southern limit of the canoe birch is near Cape Ann,[150] and the northern limit of the

[148] Hadlock, 1939, Pl. 6, *c*, 5; Smith, W. B., 1930, p. 10, Fig. 3; specimens, duplicating the one from Clark's Pond, were found at the Nevin shell heap, Blue Hill, Maine, by the expedition of the Robert S. Peabody Foundation.

[149] Dixon, 1914, p. 4.

[150] Byers, 1946, p. 6.

region along the shore in which "all conditions [are] favorable to agriculture" lies to the north of the mouth of the Merrimack River.[151]

Great Neck is located between the southern limits of canoe birch and the northern limit of the zone most favorable to agriculture as delineated by Byers, or in the zone of transition between southern and northern New England. It is not surprising, therefore, to find in the collections from Clark's Pond specimens typical of both regions.

Unilateral, single-barbed bone points present an interesting problem in distribution. These points are reasonably common in the shell heaps of the Ipswich area. Two were found at Clark's Pond (Pl. XIX, 19-20), two came from Eagle Hill,[152] and four from a small shell heap on Plum Island.[153]

Regarding Frenchman's Bay, Maine, Hadlock writes "A great variety of single barbed [bone] points (Fig. 32, 5) which were evidently used as spear points in spearing fish have been found throughout all strata of the shell heaps."[154] The points he illustrates differ from those of the Ipswich area in that the distance from the tip of the point to the barb is rather great and the barb is well offset from the shank. In the Ipswich specimens this distance is rather short and the barb is close to the shank. An examination of the fairly extensive collections of bone artifacts from Maine shell heaps in the Peabody Foundation disclosed a few bone points of the type illustrated by Hadlock but none of the type found at Clark's Pond.

Two examples of the latter form are known from southeastern Massachusetts, one from South Truro on Cape Cod[155] and the other from the Squam Swamp shell heap on Nantucket.[156] Ritchie has recently reported five from the Wickham site, a Point Peninsula-Owasco site in New York.[157] He lists these unilateral single-barbed bone points as a "linked trait"[158] indicating that they may be found in either a Point Peninsula or an Owasco site. The location of the two specimens at Clark's Pond would suggest that they are in a Point Peninsula rather than an Owasco association at the latter site.

Other traits, found at Clark's Pond but not typical of many New England

[151] Byers, 1947, p. 31.
[152] Peabody Museum, Salem, Massachusetts, cat. nos. 2414/5.
[153] Peabody Foundation, Andover, cat. nos. 7/1074/6/8/9.
[154] Hadlock, 1940, p. 344, Fig. 32, 5. Similar points are illustrated in Moorehead, 1922, Fig. 104; Smith, W. B., 1929, Figs. 19, 23; Hadlock, 1939, Pl. 7, b; Hadlock, 1941, Fig. 4, *8*.
[155] Mr. Howard Torrey, Reading, Massachusetts, personal communication.
[156] Massachusetts Archaeological Society, records, cat. no. M-52/3/201.
[157] Ritchie, 1946, Pl. 10, *46*.
[158] *Ibid.*, p. 24.

sites, include smoking pipes, globular-shaped vessels, and incised pottery. Evidence has been given to show that all three of these traits are relatively late and associated with trade goods of European origin. It has also been shown that large triangular points are relatively late. We do not have enough information available concerning the occurrence of incised pottery to permit profitable discussion of the distribution of that trait.

Under the description of pipes, similarities between some of the pipe fragments from Clark's Pond and some of the pipes found at Owasco sites in New York have been pointed out. Large triangular points are also typical of Owasco.[159] The bone arrow point made from a terminal phalangeal bone of the deer (Pl. XIX, 12) is an Owasco trait.[160] The thin globular vessels appear to me to have definite resemblances to vessels found on Owasco sites. Such resemblances include the shape, the special treatment of the neck, and the partially smoothed-over impressions of textile-wrapped paddles on the body. One such vessel is described by Ritchie as: "semiglobular body, cord-impressed surface; constricted neck; everted rim; flat vertical lip with circular dentate embellishment; rude incised chevrons on neck."[161] This vessel is a little larger than one from Clark's Pond. Except for the omission of chevrons on the neck, otherwise smooth in both cases, and the location of circular impressions on top instead of on the side of the rim, this description fits one of the vessels from Clark's Pond (Pl. XV, 4). Although attentuated, I believe Owasco influences are demonstrable at Clark's Pond.

Returning to the question of contact between Indians living at Clark's Pond and those residing in Maine, history records two raids by Maine Indians on Ipswich. History also offers information pertaining to a possible end date for Indian occupation of Great Neck. Pertinent data follows:

Sept. 7, 1630 the Court of Assistants of the Massachusetts Bay Colony ordered "that a warrant shall p'sently be sent to Aggawam [Ipswich] to comand those that are planted there forthwith to come away."[162]

The following quotations are from the diary of John Winthrop, Governor of the Massachusetts Bay Colony, as published by Savage in 1853:

Aug. 8, 1631, "The Tarentines, to the number of one hundred, came in three [thirty in other editions] canoes, and in the night assulted the wigwam of the sagamore of Agawam, by Merimack, and slew seven men, and wounded John Sagamore, and James,

[159] Ritchie, 1944, Pl. 26, *9*, *23*.
[160] Ritchie, 1944, p. 345; 1946, p. 25.
[161] Ritchie, 1944, Pl. 10, *3*.
[162] Waters, 1905, p. 9.

and some others, (thereof some died after,) and rifled a wigwam where [which] Mr. Cradock's men kept to catch sturgeon, took away their nets and biscuit, etc."[163]

Sept. 17, 1631, "Mr. Shurd of Pemaquid [Maine], sent home James Sagamore's wife, who had been taken away at the surprise at Agawam, and writ that the Indians demanded —— fathom of wampampeague and —— skins for her [ramsom]."[164]

March 1633, "The governor's son, John Winthrop, went, with twelve [more], to begin a plantation at Agawam, after called Ipswich."[165]

Dec. 5, 1633, "John Sagamore died of small pox, and almost all his people; (about thirty buried by Mr. Maverick of Winescemett [Chelsea] in one day)."[166] "James Sagamore of Sagus [Saugus] died also, and most of his folks.[167]

Between May 14 and May 24, 1634, "Mr. Parker, a minister, and a company with him, being about one hundred, went to sit down at Agawam, and divers others of new comers."[168]

In November of 1634 the town of Ipswich voted that Great Neck "shall remayne for common use unto the Town forever."[169]

Several points of interest may be gleaned from the above quotations. Colonists were living in Ipswich before the abandonment of Agawam by Indians. This is clear from the fact that settlers were commanded to leave Ipswich in 1630, the year before the raid by Tarentines. We do not know just where these settlers lived, nor the locations of the wigwam of the sagamore of Agawam and that of Mr. Cradock's men. However, the mention of sturgeon (found in the mouths of rivers), later use of Great Neck and Little Neck by fishermen, William Jeffrey's title to Great Neck (secured from Indians between 1623 and 1633) and the accessibility of Great Neck to raiders coming from the north via Plum Island River (Fig. 14) all suggest that Great Neck was the scene of this raid. Indians must have left Great Neck and the neighboring part of Ipswich (where the first permanent settlement was made) by the spring of 1633. Thus the last possible date for occupation of Great Neck by Indians would be 1632, possibly 1633.

Minor points included in the account of the raid by Tarentines may be of interest. The number killed and wounded suggests a fairly large settlement of Indians at Ipswich in 1631. However, John Sagamore and his brother James were not Agawam Indians. John was sagamore of Chelsea,[170] James was

[163] Savage, 1853, p. 71.
[164] *Ibid.*, p. 73.
[165] *Ibid.*, p. 120.
[166] *Ibid.*, p. 142.
[167] *Loc. cit.*
[168] *Ibid.*, p. 158.
[169] Waters, 1905, p. 60.
[170] Lewis, 1844, p. 38.

sagamore of Saugus and Lynn.[171] Wood's map of Massachusetts, drawn in 1633, locates James' home in Saugus and John's in what is now Medford.[172] They lived in the same places where, Winthrop writes, they died of small pox. While they were friends of Masconomo (or Maskonominet), Sagamore of Agawam, Ipswich was not their home. It is certain that John, his brother James, and the latter's wife were visiting Agawam at the time of the raid. A social gathering of some nature seems suggested and others, as well as John and James, may have been visitors.

An account of the second raid at Ipswich by Tarentine Indians was written by Cobbet, a minister of Ipswich, in 1677 after talking with John Perkins, Jr., the chief actor in the affair, as follows:

> About five or six years after [see explanation below], in the first planting of Ipswich, (as a credible man informed me, namely, Quartermaster Perkins,) the Terrateens or Easterly Indians had a design to have cut them off at the first, when they had but between 20 or 30 men, old and young, belonging to the place (and at that instant most of the men gone into the Bay about their occasions, not hearing of any intimations thereof.) It was thus one Robin, a friendly Indian, came to this John Perkins, then a young man living then in a little hut upon his father's Island, on this side of Jeofrye's Neck, and told him that on such a Thursday morning, early, there would come four Indians, to draw him to goe down the Hill to the waterside, to truck with them, which if he did, he and all neare him would be cut off: for there were 40 burchen canoues, would lie out of sight, in the brow of the Hill, full of Armed Indians for that purpose: of this he forthwith acquaints Mr. Winthrop [Jr.], who then lived there, in a howse neare the water, who advised him if such Indians came, to carry it ruggedly towards them, and threaten to shoot them if they would not be gone, and when theyr backs were turned to strike up the drum he had with him, besides his two muskets, and then to discharge them; that those six or eight young men, who were in the marshes hard by a mowing, haveing theyr guns each of them ready charged, by them, might take the Alarme, and the Indians would perceive theyr plot was discovered: and haste away to sea againe: which was accordingly so acted and tooke like effect: for he told me, he presently after discovered 40 such canoues sheare off from under the Hill, and make as fast as they could to sea. And no doubt but many godly hearts were lifted up to heaven for deliverances, both in that deliverance at Salem, and this at Ipswich.[173]

An account of the "deliverance at Salem" is given in the previous paragraph of Cobbet's manuscript. It refers to a threatened attack on Salem by Indians of Saugus not by Tarentines. This incident occurred in 1628. "Five or six years after" this event, as given by Cobbet, would mean 1633 or 1634. Probably the second raid on Ipswich by Tarentines occurred in the fall of

[171] Drake, 1856, p. 111.
[172] Young, 1846, p. 389.
[173] Cobbet, 1677.

1633. That would be after the settlers who arrived in March of that year had had time to build homes but before the large number of people with Parker arrived in May of 1634. The "first planting of Ipswich" could only refer to that period of time.

Taking the evidence given by Cobbet as correct, the 1633 Tarentine raid may be confidently located as occurring at Great Neck or at Eagle Hill immediately to the west (Fig. 14). The house of John Perkins, Sr., built before November 1634, was located on East Street at Glovers Corner where the road forks. One branch leads to Great Neck and the other to what used to be called Manning's Neck.[174] At a later date Thomas Brecy "seems to have bought the large pasture that abutted on the road to Jeffrey's Neck [Great Neck] of John Perkins."[175] This indicates that John, Sr., at one time owned land between his house and Great Neck. There are several locations in this area where John, Jr., may have had his "hut upon his father's Island, on this side of Joefrye's Neck." Perkins' location of the Indian canoes "in the brow of the Hill" makes sense if we interpret it as meaning "behind" the brow of the hill. Clark's Pond, on the east side of Great Neck, would fulfill this description exactly (Fig. 14). At that time the pond was open to Plum Island Sound and would have been ideal for beaching and hiding forty canoes. The alternative, behind Eagle Hill, would have been more exposed to the view of the Colonists and, possibly, crowded for such a large armada.

Ipswich tradition places this raid of the Tarentines at Treadwell's (Perkins') Island on the south side of the Ipswich River (Fig. 14). I feel this interpretation to be incorrect as it does violence to the facts. Perkins' account as given by Cobbet, is extremely specific. There are two large and several small "marsh" islands between Perkins' original home and Great Neck. The Perkins' family history says Perkins, Sr., owned six acres of upland and six "of meadow on the road to Jeffries [Great] Neck."[176] Perkins, Jr., says "his father's Island, on this side of Joefrye's Neck." Records do not indicate that Perkins, Sr., or Jr., owned land on the south side of the river until 1635. As Perkins specified "in the first planting" and that only "20 or 30 men, old and young" were in the settlement at the time of the raid, the date must have been 1633 and the location at or near Great Neck.

The first raid at Ipswich by Tarentines is well documented by Mr. Shurd's return of James Sagamore's wife. The second raid is only attested to by the tes-

[174] Waters, 1912, p. 1.
[175] *Ibid.*, p. 18.
[176] Perkins, 1889.

timony of John Perkins, Jr. There is no reason for not accepting his account as history. The occurrence of two such raids by fairly large numbers of Indians shows a good knowledge of routes between Maine and Ipswich. Archaeological data from the site at Clark's Pond indicate prehistoric connections between that site and Maine. Such connections may not always have been of a warlike character.

Indians called Tarentines are known to have lived near the mouth of the Penobscot River in Maine in the early part of the seventeenth century. The mouth of this river is included in the coastal region of Maine where Mt. Kineo felsite was deposited by glacial action. Pemaquid is about thirty miles southwest of the Penobscot and about a hundred and ten miles northeast of Ipswich. Indians going from the Penobscot to Ipswich by canoe would have to pass close to Pemaquid. Irrespective of whether the Indians who raided Ipswich were actually Tarentines or whether the depredations of other Maine Indians were blamed on Tarentines, the return of James Sagamore's wife by Mr. Shurd places the raiders from at least as far northeast as Pemaquid. The raiders may have come from about the same area in Maine as that in which Mt. Kineo felsite, found at Clark's Pond, was available.

CONCLUSIONS

THE shell heap at Clark's Pond and the extensive shell deposits to the north (Fig. 14, F and G) may all be part of the same site. Until such deposits are investigated it is necessary to consider Clark's Pond as a separate unit.

At Clark's Pond the inhabited area is small. It is doubtful if more than one family ever occupied it at one time. Certainly an extended family would be all that would be required, over a period of years, to account for the accumulation of food remains and industrial products. Occupation, either continuous or intermittent, covered both a prehistoric period and one during which the inhabitants were in contact with Europeans.

Indians living at Clark's Pond caught fish, hunted game, both animals and birds, and collected shell fish and nuts for food. There is no evidence that they practiced agriculture. They made pottery containers and dug storage pits. Stone, from which they made projectile points and other tools, was brought to the site. Some of these stone tools were used to make others of bone and of wood. Needles indicate that the inhabitants sewed or made netting. They used fire for warmth and cooking. Of possible shelters we have no indication.

Life was not purely humdrum. Their aesthetic sense was appeased by ornaments and expressed in pottery decoration. Materials for paint were present. For idle moments they had games of chance and the solace of the pipe. Judging from the relatively high incidence of non-essential items, they led a fuller life than many Indians of Massachusetts. Possibly Clark's Pond was the residence of a local leader or special craftsman. It may have been the "wigwam of the sagamore of Agawam" raided by Tarentines in 1631.

Artifacts from Clark's Pond seem to indicate a fairly long but intermittent occupation in spite of the shallowness of cultural debris. These artifacts have been divided into those representing an early and a late period. These periods overlap each other. Typical of the early period or periods are various types of stemmed points, asymmetric trianguloid knives, plummets and medium coarse mineral-tempered or shell-tempered pottery. This pottery has rounded or flattened rims and nearly straight sides. It is decorated with impressions of cord- or textile-wrapped paddles, cord wound sticks, rocker dies and punctate holes. Probably a few triangular points should be included for this period.

The later period is represented by triangular and corner-notched points, and smoking pipes. Fine mineral-tempered, globular shaped vessels with constricted necks and everted rims are very late. Cord- or textile-wrapped paddle impressions are somewhat smoothed over and incision is an alternate form of decora-

tion. Metal, both native copper and European brass, is found in this period.

Indians living at Clark's Pond were affected by the major cultural influences entering the area. At an early period they seem to have had a culture representing a blend of traits characteristic of southern New England and those characteristic of northern New England, with the emphasis towards Maine. At a later time influences allied to the Owasco of New York introduced globular vessels, clay smoking pipes, and large triangular projectile points. Last, but by far the most important culturally, as it soon caused their abandonment of the area, was contact with European colonists.

BIBLIOGRAPHY

ANONYMOUS.

1875. *County Atlas of Middlesex, Massachusetts.* J. B. Beers & Co., New York

BAILEY, JOHN H.

1939. "A Ground Slate Producing Site Near Vergennes, Vermont." *Bulletin of the Champlain Valley Archaeological Society,* Vol. I, No. 2.

BAILEY, SARAH LORING

1880. *Historic Sketches of Andover,* Houghton, Mifflin and Co., Boston.

BOISSEVAIN, ETHEL

1943. "Observations of a Group of Shell Heaps on Cape Cod." *Bulletin of the Massachusetts Archaeological Society,* Vol. V, No. 1.

BROWN, JOHN C.

1939. *The Jones Pond Shell Heap,* The Narragansett Archaeological Society of Rhode Island, Providence, R.I.

BULLEN, ADELAIDE K., and RIPLEY P.

1945. "Black Lucy's Garden," *Bulletin of the Massachusetts Archaeological Society,* Vol. VI, No. 2.

BULLEN, RIPLEY P.

1942. "Forts, Boundaries, or Ha-Has?" *Bulletin of the Massachusetts Archaeological Society,* Vol. IV, No. 1.

1946*a*. "The Foster's Cove Site," *Bulletin of the Massachusetts Archaeological Society,* Vol. VII, No. 2.

1946*b*. "An Indian Site in Andover, Massachusetts," *Bulletin of Massachusetts Archaeological Society,* Vol. VII, No. 2.

1946*c*. "Suggestions of Stratigraphy in Eastern Massachusetts." *Bulletin of the Massachusetts Archaeological Society,* Vol. VII, No. 3.

BULLEN, RIPLEY P., and EDWARD BROOKS

1947. "The Squam Pond Indian Site," *Bulletin of the Massachusetts Archaeological Society,* Vol. VIII, No. 4.

BULLEN, RIPLEY P., and J. FREDERICK BURTT

1947. "The Neck Creek Shell Heap, Ipswich, Massachusetts." *Bulletin of the Massachusetts Archaeological Society,* Vol. IX, No. 1.

BULLEN, RIPLEY P., and ARTHUR M. HOFMANN

1944*a*. "The Stickney Site, Ballardvale, Massachusetts," *Bulletin of the Massachusetts Archaeological Society,* Vol. V, No. 2.

1944*b*. "The Hofmann Site," *American Antiquity,* Vol. X, No. 2.

BURRAGE, HENRY S.

1906. *Early English and French Voyages. Original Narratives of Early American History,* Charles Scribner's Sons, New York.

BYERS, DOUGLAS S.

1944. "A Possible Explanation of Fire-beds of Hearths," *Bulletin of the Massachusetts Archaeological Society,* Vol. V, No. 4.

1946. "The Environment of the Northeast," in *Man in Northeastern North-America,* Papers of the Robert S. Peabody Foundation for Archaeology, Vol. III.

1947. "Notes on the Environment of New England," *Bulletin of the Massachusetts Archaeological Society,* Vol. VIII, No. 2.

BYERS, DOUGLAS S., and FREDERICK JOHNSON
1940. *Two Sites on Martha's Vineyard*, Papers of the Robert S. Peabody Foundation for Archaeology, Vol. I, No. 1.

CLAFLIN, WILLIAM H., JR.
1931. *The Stalling's Island Mound, Columbia County, Georgia*, Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, Vol. XIV, No. 1.

COBBET, T.
1677. "A Narrative of New England's Deliverances." Being a manuscript prepared at the request of Dr. Increase Mather and sent to him in the form of a letter, copied and published by the editor in 1853 in *The New England Historical and Genealogical Register*, Vol. VII, pp. 209-219, Boston.

CROSS, DOROTHY
1941. *Archaeology of New Jersey*, Vol. I, The Archaeological Society of New Jersey and the New Jersey State Museum, Trenton, New Jersey.

DELABARRE, EDMUND B.
1925. "A Possible Pre-Algonkian Culture in Southeastern Massachusetts," *American Anthropologist*, N.S., Vol. 27, No. 3.

DIXON, ROLAND B.
1914. "The Early Migrations of the Indians of New England and the Maritime Provinces." Reprinted from the *Proceedings of the American Antiquarian Society*, April 1914, Worcester.

DRAKE, SAMUEL G.
1856. *Biography and History of the Indians of North America.* 11th edition, Sanborn, Carter, and Bazin, Boston.

FORD, JAMES A., and GEORGE I. QUIMBY, JR.
1945. *The Tchefuncte Culture*, Society for American Archaeology, Memoir No. 2.

FORD, JAMES A., and GORDON R. WILLEY
1941. "An Interpretation of the Pre-history of the Eastern United States, *American Anthropologist*, N.S., Vol. 43, No. 3.

GRIFFIN, JAMES B.
1943. *The Fort Ancient Aspect*, University of Michigan Press, Ann Arbor, Michigan.

HADLOCK, WENDELL S.
1939. *The Taft's Point Shell Mound at West Gouldsboro, Maine.* Bulletin 5 of The Robert Abbe Museum, Bar Harbor, Maine.
1940. "Bone Implements from Shell Heaps around Frenchman's Bay, Maine." *American Antiquity*, Vol. VIII, No. 4.
1941. *Three Shell Heaps on Frenchman's Bay.* Bulletin 6 of The Robert Abbe Museum, Bar Harbor, Maine.

HAWKES, E. W., and RALPH LINTON
1916. *A Pre-Lenape Site in New Jersey*, University of Pennsylvania, Anthropological Publications, Vol. VI, No. 3.

HOFMANN, ARTHUR M.
1940. "Results of Thorough Excavation and Careful Study," *Bulletin of the Massachusetts Archaeological Society*, Vol. I, No. 4.

1942. "A Stone Pavement at Andover, Massachusetts," *Bulletin of the Massachusetts Archaeological Society*, Vol. III, No. 2.

1943. "A Strange Deposit of Spearpoints," *Bulletin of the Massachusetts Archaeological Society*, Vol. V, No. 1.

LEAVITT, H. WALTER, and EDWARD H. PERKINS

1935. "Glacial Geology of Maine," Vol. II, of *A Survey of Road Materials and Glacial Geology of Maine*, Bulletin No. 30, Maine Technology Experimental Station, University Press, Orono, Maine.

LEWIS, ALONZO

1844. *The History of Lynn, Including Nahant.* 2nd Edition, Samuel N. Dickinson, Boston.

MERCER, H. C.

1929. *Ancient Carpenter's Tools.* The Southworth Press, Portland, Maine.

MOFFETT, ROSS

1946. "The Peaked Hill Site," *Bulletin of the Massachusetts Archaeological Society*, Vol. VII, No. 3.

MOOREHEAD, WARREN K.

1912. *Certain Peculiar Earthworks Near Andover, Massachusetts*, Department of Archaeology, Phillips Academy, Andover, Mass., Bulletin V.

1922. *A Report on the Archaeology of Maine.* Department of Archaeology, Phillips Academy, Andover, Mass.

1931. *The Merrimack Archaeological Survey.* Peabody Museum, Salem, Massachusetts.

MOVIUS, HALLAM L.

1941. "First Interim Report of the Excavations at Site M-23/26," *Bulletin of the Massachusetts Archaeological Society*, Vol. II, No. 2.

PERKINS, GEORGE A.

1889. *The Family of John Perkins of Ipswich, Massachusetts.* Salem Press Publishing and Printing Co., Salem, Massachusetts.

PRAUS, ALEXIS A.

1945. "The South Woodstock Site," *Bulletin of the Archeological Society of Connecticut*, No. 17.

PUTNAM, F. W.

1882. In *Bulletin of the Essex Institute*, Salem, Mass., Vol. XIV.

RAUP, HUGH, and FREDERICK JOHNSON

1947. *Grassy Island. Archaeological and Botanical Investigations of an Indian Site in the Taunton River, Massachusetts.* Papers of the Robert S. Peabody Foundation for Archaeology, Vol. I, No. 2, Andover.

RIDGWAY, ROBERT

1912. *Color Standards and Color Nomenclature.* Washington, D.C.

RITCHIE, WILLIAM A.

1932. *The Lamoka Lake Site; the Type Station of the Archaic Algonkin Period in New York.* Researches and Transactions of the New York State Archaeological Association, Vol. VII, No. 1.

1934. *An Algonkin-Iroquois Contact Site on Castle Creek, Broome County, New York.* Research Records of the Rochester Museum of Arts and Sciences. No. 2.

1936. *A Prehistoric Fortified Village Site at Canandaigua, Ontario County, New York.* Research Records of the Rochester Museum of Arts and Sciences, No. 3.

1940. *Two Prehistoric Village Sites at Brewerton, New York,* Researches and Transactions of the New York Archaeological Association, Rochester, New York, Vol. IX, No. 1.

1944. *The Pre-Iroquoian Occupation of New York State.* Rochester Museum of Arts and Sciences, Memoir No. 1.

1945. *An Early Site in Cayuga County, New York.* Researches and Transactions of the Lewis H. Morgan Chapter, New York State Archaeological Association, Rochester, N.Y., Vol. X, No. 1.

1946. *A Stratified Prehistoric Site at Brewerton, New York.* Research Records of the Rochester Museum of Arts and Sciences, No. 8.

ROBBINS, MAURICE

1944. *The Faulkner Spring Site,* Papers of the Attleboro Museum of Art and History, Attleboro, Mass., No. 1.

1946. "The Ford Site," *American Antiquity,* Vol. XII, No. 2.

ROBINSON, JOHN

1882. "Opening of a Newly Discovered Shellheap at Ipswich." *Bulletin of the Essex Institute,* Salem, Mass., Vol. XIV.

ROGERS, EDWARD H.

1943. "The Indian Village Site, Milford, Connecticut." *Bulletin of the Archeological Society of Connecticut,* No. 15.

ROUSE, IRVING

1947. "Ceramic Traditions and Sequences in Connecticut." *Bulletin of the Archeological Society of Connecticut,* No. 21.

ROWE, JOHN H.

1940. *Excavations in the Waterside Shell Heap, Frenchman's Bay, Maine.* Papers of the Excavator's Club, Vol. 1, No. 3, Cambridge, Mass.

SAVAGE, JOHN

1853. *The History of New England from 1630 to 1649 by John Winthrop.* Third Edition, Little Brown and Co., Boston.

SEARS, JOHN HENRY

1905. *The Physical Geography, Geology, Mineralogy, and Paleontology of Essex County, Massachusetts.* Essex Institute, Salem, Mass.

SKINNER, ALANSON

1919. *Exploration of Aboriginal Sites at Throgs Neck and Clason's Point, New York City,* Contributions from the Museum of the American Indian, Heye Foundation, Vol. V, No. 4.

SMITH, CARLYLE S.

1944. "Clues to the Chronology of Coastal New York," *American Antiquity,* Vol. X, No. 1.

1947. "An Outline of the Archaeology of Coastal New York." *Bulletin of the Archeological Society of Connecticut,* No. 21.

SMITH, HARLAN I.

1929. "The Archaeology of Merigomish Harbour, Nova Scotia," in *Some Shell Heaps in Nova Scotia*, by H. I. Smith and W. J. Wintemberg. Canada, Department of Mines, National Museum Bulletin 47, Anthropological Series, No. 9.

SMITH, WALTER B.

1929. *The Jones Cove Shell-Heap at West Gouldsboro, Maine.* Bulletin I of the Lafayette National Park Museum, Bar Harbor, Maine.

1930. *The Lost Red Paint People of Maine.* Bulletin II of the Lafayette National Park Museum, Bar Harbor, Maine.

TORREY, HOWARD

1946. "Evidences of Typological Stratigraphy at Seth's Swamp Site, Wellfleet, Massachusetts." *Bulletin of the Massachusetts Archaeological Society*, Vol. VII, No. 3.

WATERS, THOMAS F.

1905. *Ipswich in Massachusetts Bay Colony.* Ipswich Historical Society, Ipswich, Mass.

1912. *Jeffrey's Neck and The Way Leading Thereto.* Publications of the Ipswich Historical Society, XVIII, Ipswich, Mass.

WEBB, WILLIAM S.

1939. *An Archeological Survey of the Wheeler Basin on the Tennessee River in Northern Alabama*, Bureau of American Ethnology, Bulletin 122.

WEBB, WILLIAM S., and DAVID L. DEJARNETTE

1942. *An Archeological Survey of Pickwick Basin in the Adjacent Portions of the States of Alabama, Mississippi and Tennessee*, Bureau of American Ethnology, Bulletin 129.

WEBB, WILLIAM S., and WILLIAM H. HAAG

1939. *The Chiggerville Site*, Reports in Anthropology and Archaeology, University of Kentucky, Vol. IV, No. 1.

1940. *Cypress Creek Villages*, Reports in Anthropology and Archaeology, University of Kentucky, Vol. IV, No. 2.

WEBB, WILLIAM S., and CHARLES E. SNOW

1945. *The Adena People*, Reports in Anthropology and Archaeology, University of Kentucky, Vol. VI.

WEST, GEORGE A.

1929. *Copper: Its Mining and Use by the Aborigines of the Lake Superior Region.* Bulletin of the Public Museum of Milwaukee, Wisconsin, Vol. X, No. 1.

WILLOUGHBY, CHARLES C.

1924. *Indian Burial Place at Winthrop, Massachusetts.* Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, Vol. XI, No. 1.

1935. *Antiquities of the New England Indians, with Notes on the Ancient Cultures of the Adjacent Territory.* Published by the Peabody Museum of American Archaeology and Ethnology, Cambridge.

WRIGHT, GEORGE F.
1880. "Prehistoric Andover" in Bailey, S. L., *Historic Sketches of Andover*, Houghton, Mifflin and Co., Boston, Mass.

WYMAN, JEFFRIES
1867. *An Account of Some Kjoekkenmoeddings, or Shell-Heaps, in Maine and Massachusetts*. Essex Institute Press, reprinted from the eleventh number of *The American Naturalist*.

YOUNG, ALEXANDER
1846. *Chronicles of the First Planters of the Colony of Massachusetts Bay*. Charles C. Little and James Brown, Boston, Mass.

PAPERS OF THE
ROBERT S. PEABODY FOUNDATION
FOR ARCHAEOLOGY

VOLUME ONE

PHILLIPS ACADEMY · ANDOVER, MASSACHUSETTS
PUBLISHED BY THE FOUNDATION

CONTENTS

PLATES

ERRATA

Plate I, No. 2: for 56 cm. read 46 cm.; Plate II, for 1-3, 5, from loam, read 1, 3, 4, from loam; for 4, 6-13, 22, 25, read 2, 6-13, 22, 25; Plate XV, for 1-4, read 1, 2, 4; for 15-19, read 3, 15-19.

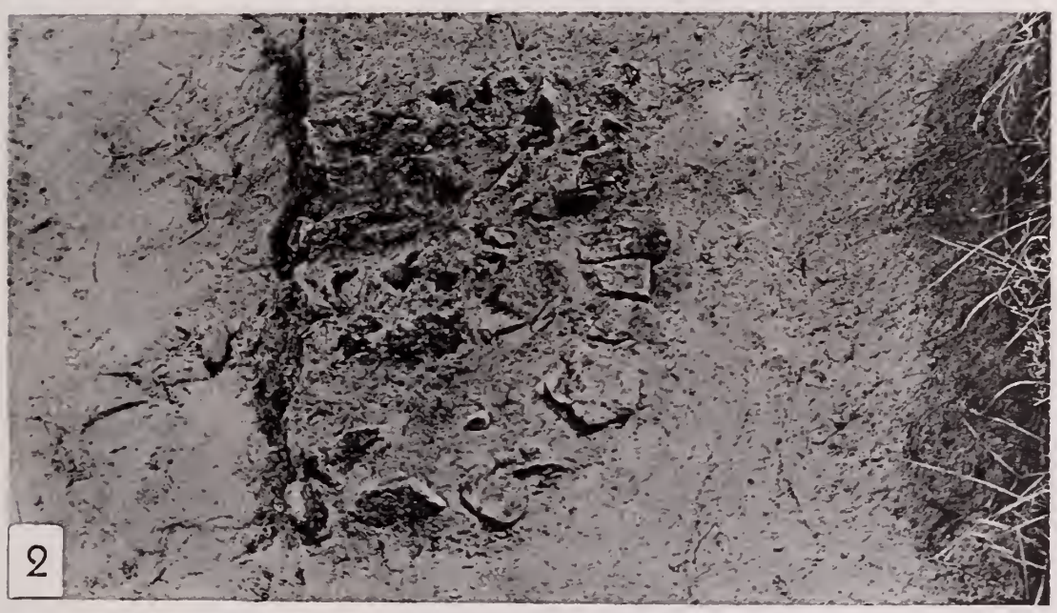

PLATE I

Hofmann Site: Structural features.

1. Double hearth, 2 m. 38 cm. overall width.
2. Small pavement, 51 x 56 cm.
3. Large pavement and accompanying pit, length of tape 90 cm.

PLATE II

Hofmann Site: Miscellaneous Artifacts.

1-3, 5, from loam; 4, 6-13, 22, 25, from loam and upper 8 centimeters of red-brown sand; 14-21, 23, 24, 26-28, from red-brown and yellow-brown sand.

PLATE III

Foster's Cove Site: Projectile Points.

1-10, from loam; 11-18, from upper portion yellow-brown sand; 19-25, from lower portion yellow-brown sand. Approximately ½ natural size.

PLATE IV

Foster's Cove Site: Knives, Scrapers, and Drills.

8, 13, from loam; 1, 2, from base of loam and top of yellow-brown sand; 3-5, 7, 9, 10, 14, from upper portion yellow-brown sand; 6, 11, 12, 15-17, from lower portion yellow-brown sand.

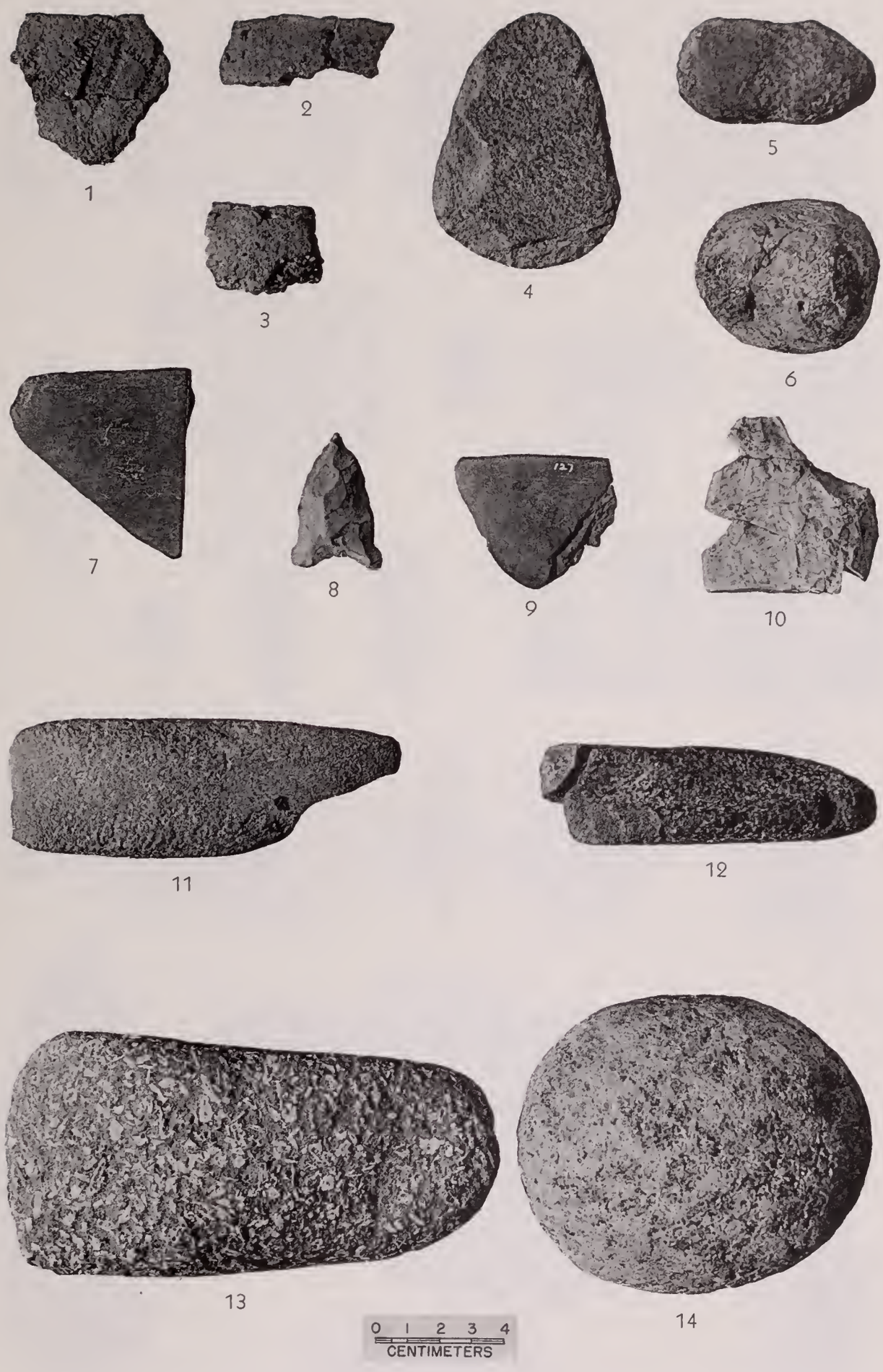

PLATE V

Foster's Cove Site: Miscellaneous Artifacts.

1 and 2, from loam; 3, from top of yellow-brown sand; balance from yellow-brown sand.

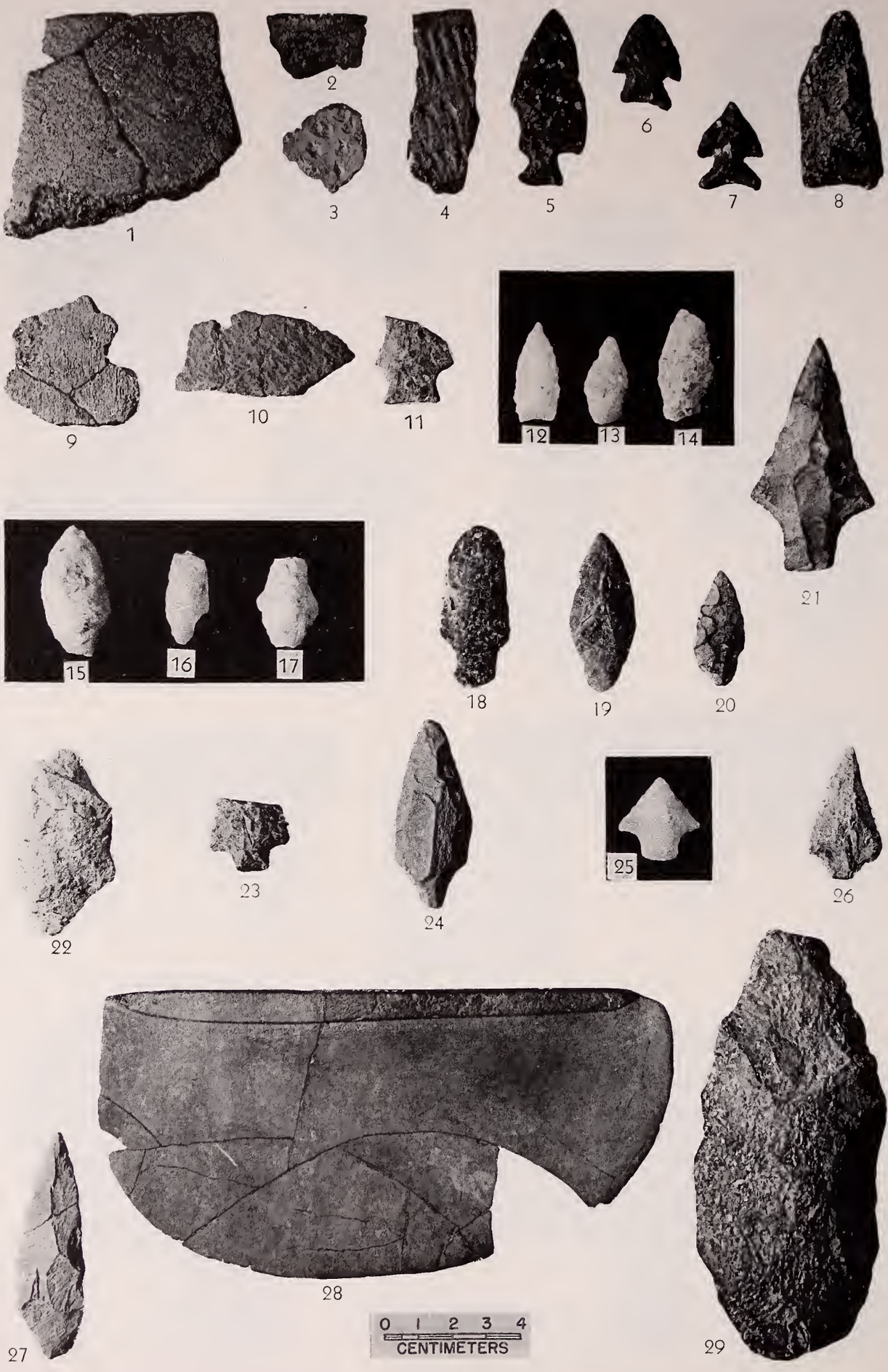

PLATE VI

Maud Eaton, Test VI: Miscellaneous Artifacts.

1-8, from loam; 9-21, from yellow-brown sand; 22-29, from loose sand and gravel or deep yellow-brown sand.

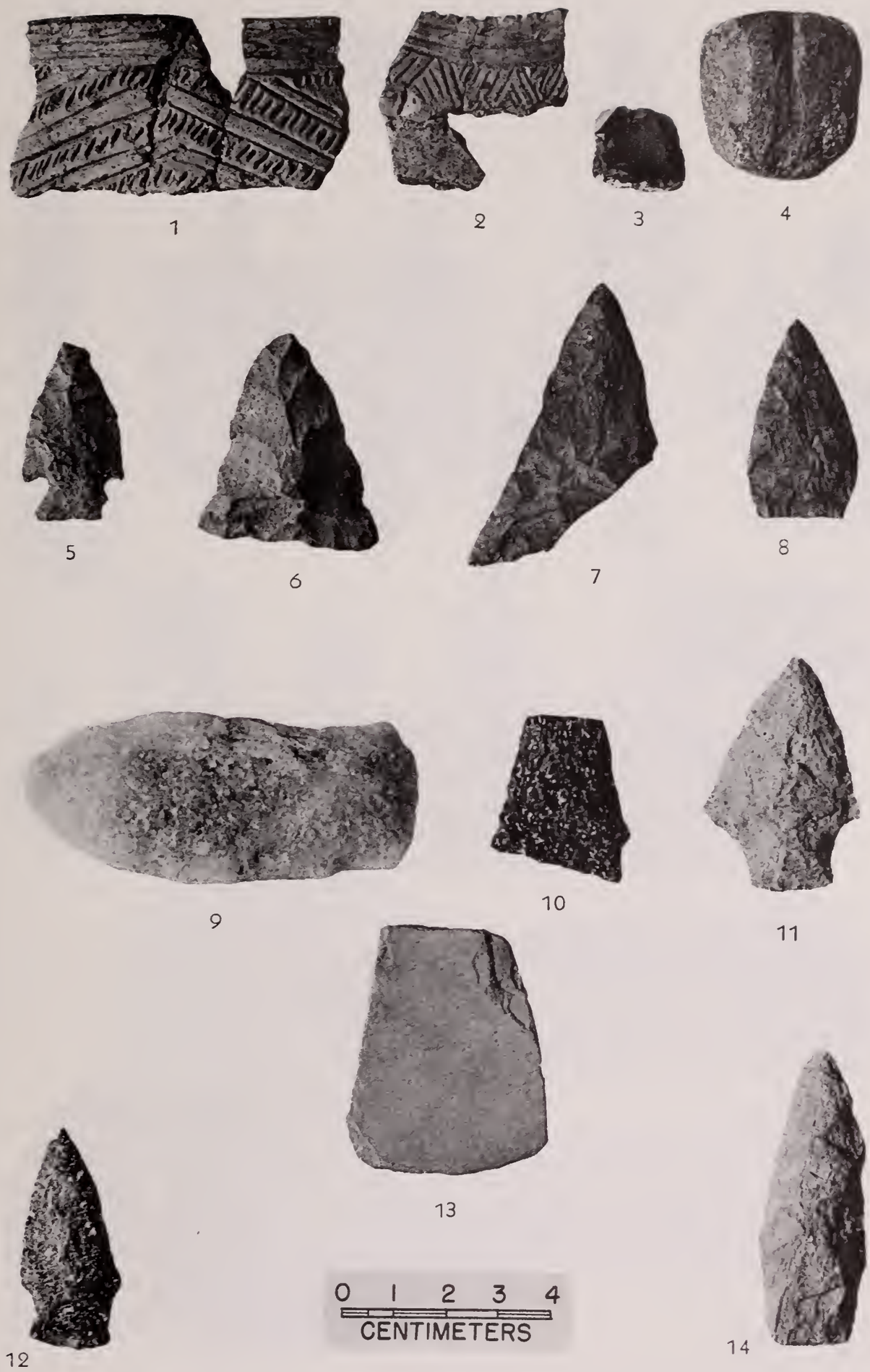

PLATE VII

Maud Eaton, Test VII: Miscellaneous Artifacts.

1-8, from loam; 9-11, from yellow-brown sand; 12-14, from loose sand and gravel.

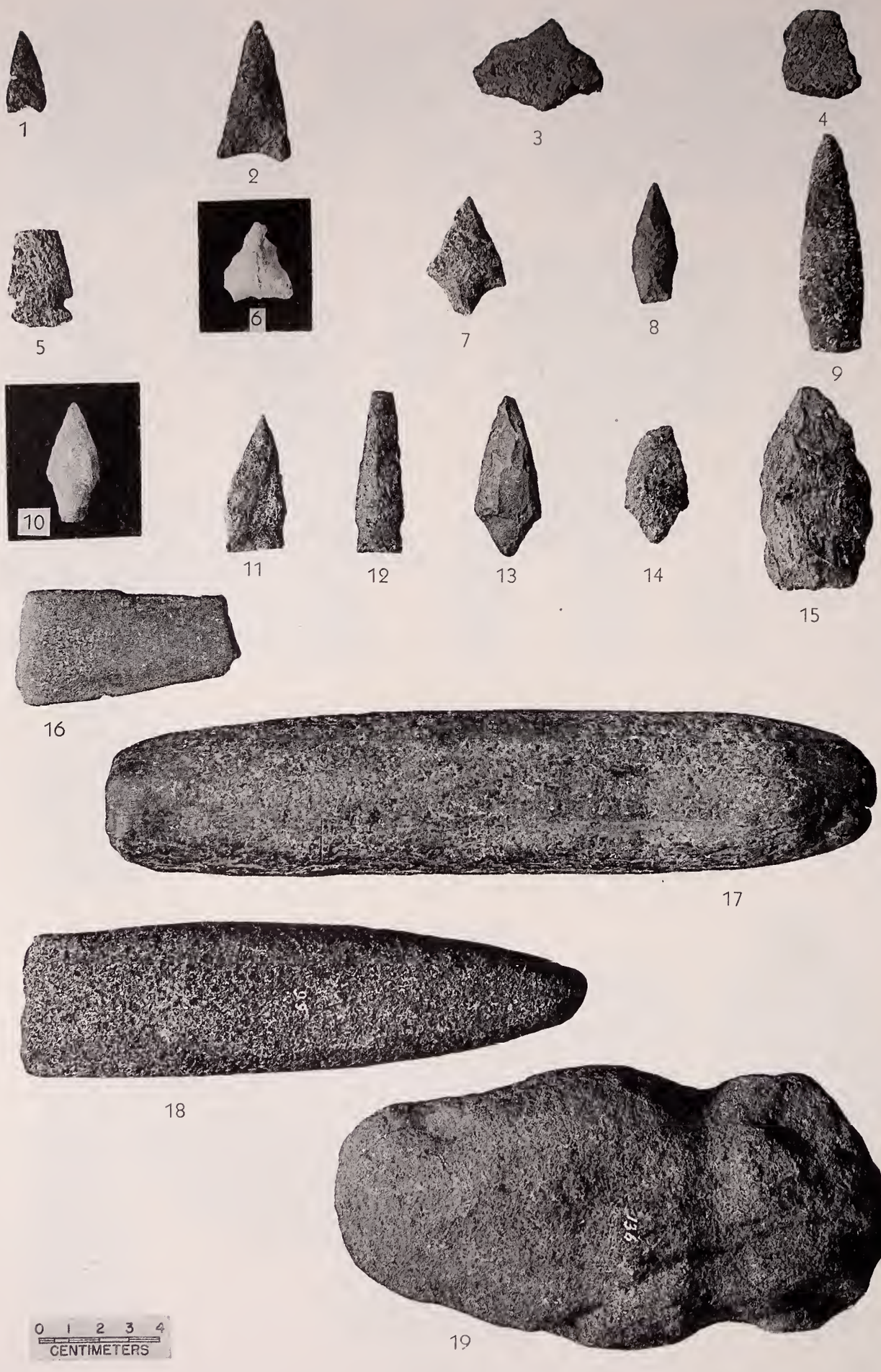

PLATE VIII

Camp Manning: Miscellaneous Artifacts.

1, 2, from loam; 3, 4, base of loam; 5-9, upper 7 cm. of yellow-brown sand; 10-15, lower 7 cm. of yellow-brown sand; 16-19, base of loam and top of yellow-brown sand.

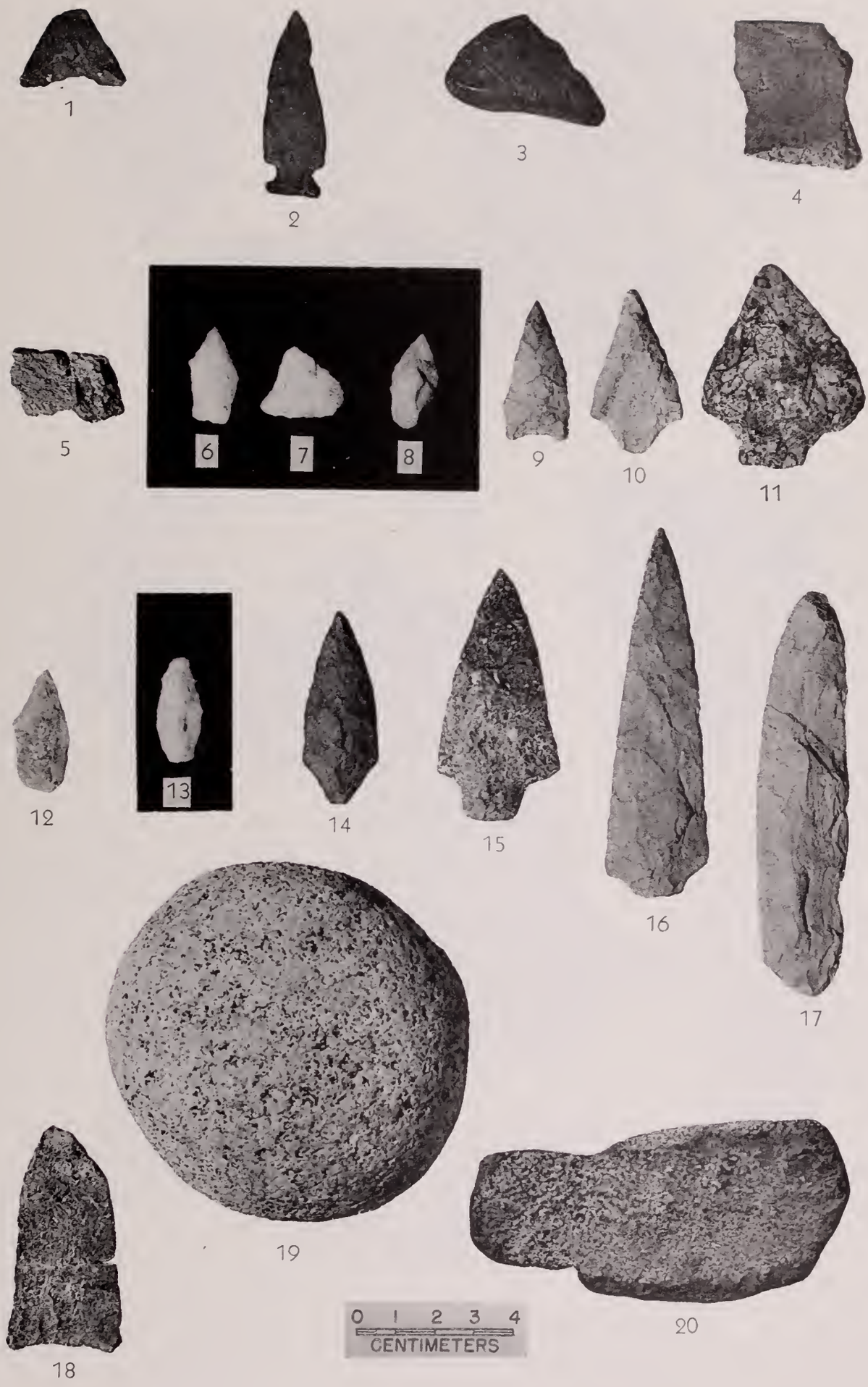

PLATE IX

Pringle Site: Miscellaneous Artifacts.

1-4, from loam; 5-19, yellow-brown sand; 20, loam of test VI.

1

2

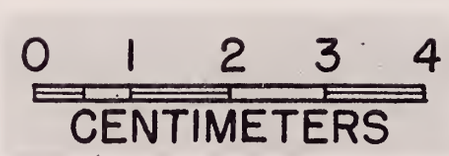

PLATE X

Lacy Site: Portions of pottery vessel and copper spear.

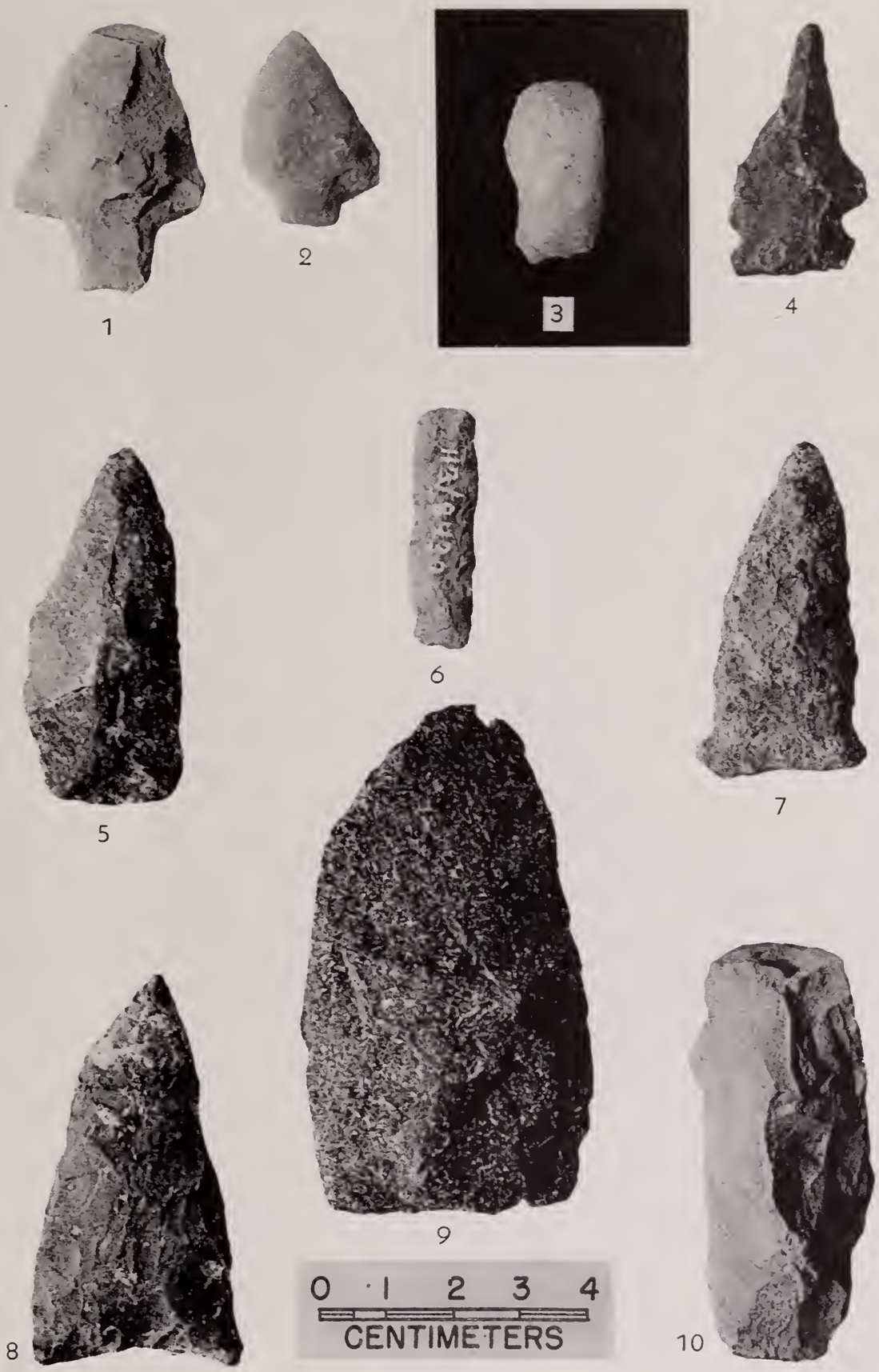

PLATE XI
Flint's Woods Site: Chipped Artifacts.

PLATE XII
Van Steensburg Site: Hearth 2.

PLATE XIII

Van Steensburg Site: Miscellaneous Artifacts.

PLATE XIV

Clark's Pond: Miscellaneous Artifacts from small excavation.

1, pottery, fine mineral temper, note scalloped rim and repair hole; 2, 3, 12, red jasper; 4, red chert; 5, graphite; 6, hone of slate; 7, pottery, medium coarse mineral temper; 8-10, bone; 11, button(?) of bone; 13, pecked cobble, striated, granite.

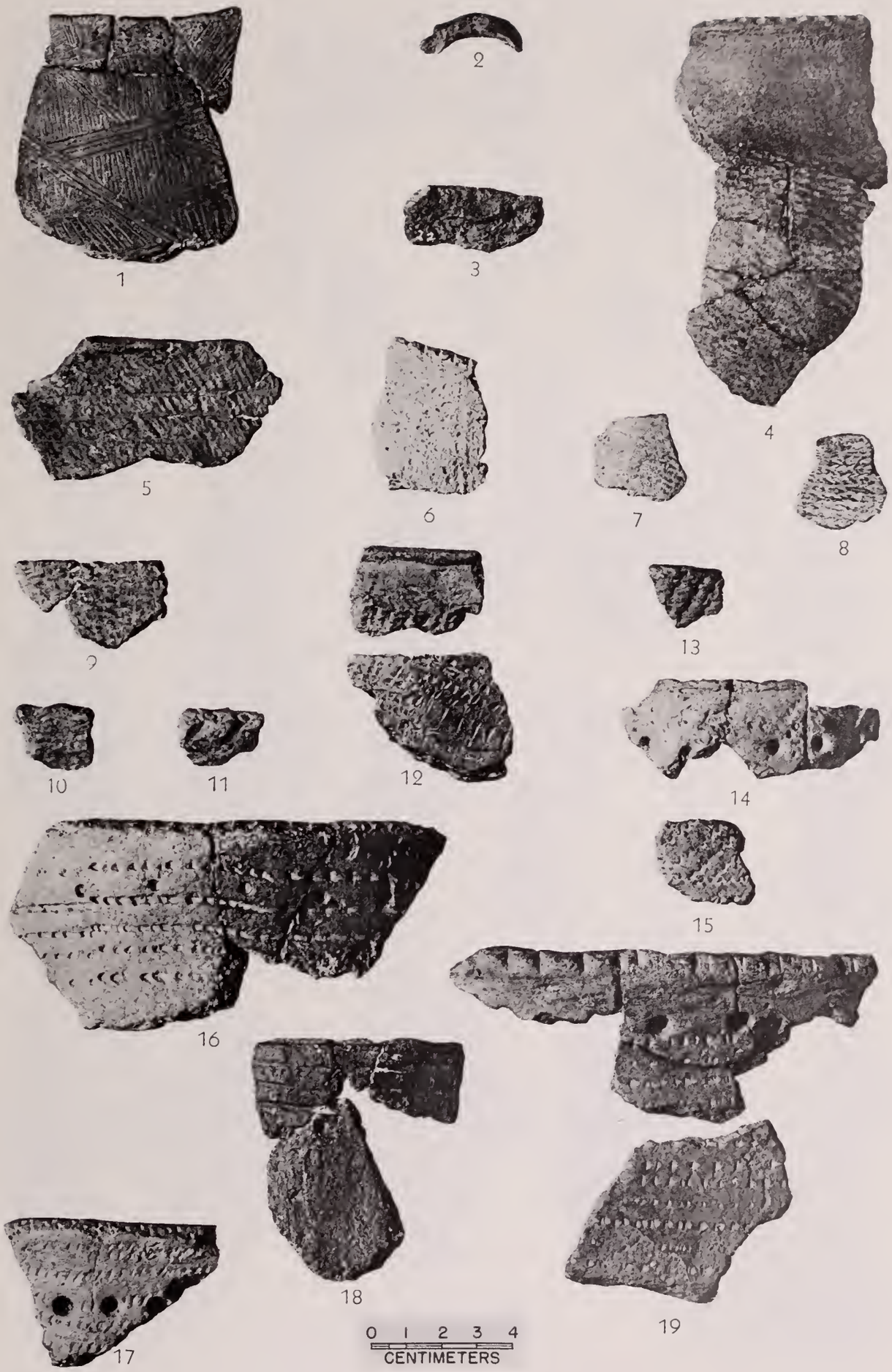

PLATE XV

Clark's Pond: Sherds.

1-4, fine mineral temper; 5-14, shell temper; 15-19, medium coarse mineral temper.

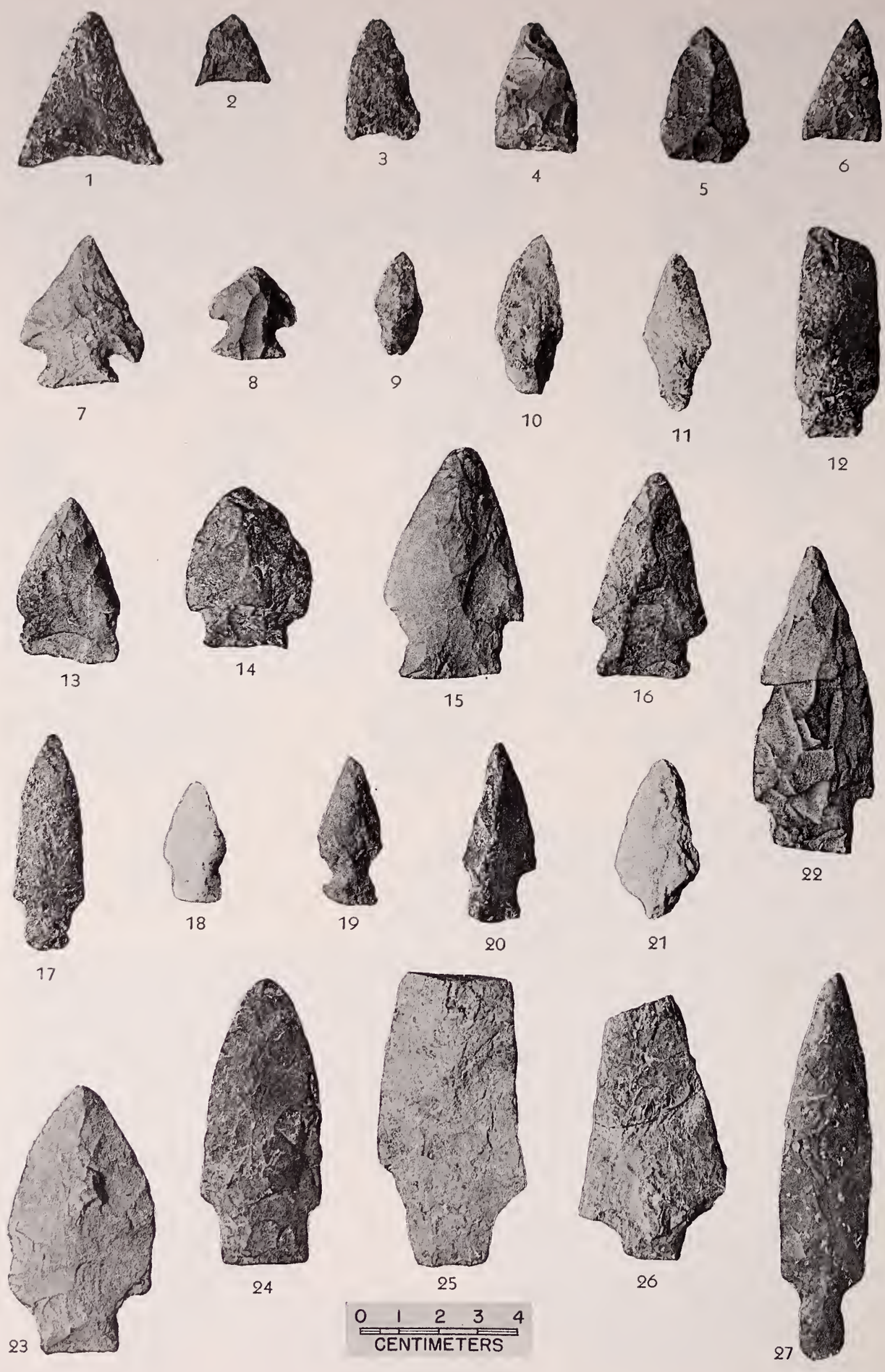

PLATE XVI

Clark's Pond: Projectile points.

1, 6, 9, 11, 12, 17, 20, 25-27, felsite; 2, 3, 19, 21, quartzite; 4, 7, 8, yellow chert; 5, red jasper; 10, 18, quartz; 13-16, 22, 23, trap; 24, rhyolite.

PLATE XVII

Clark's Pond: Miscellaneous Chipped Artifacts.

1, 2, 4, 8, 9, 12, 13, 17, 20, 23, 33, felsite; 6, 7, 10, 11, 16, 19, 24, trap; 3, 14, 15, 21, 32, rhyolite; 5, 27, 28, gray chert; 30, 31, yellow chert; 29, red chert; 22, green chert; 18, 25, 26, 34, 35, quartz.

PLATE XVIII

Clark's Pond: Miscellaneous heavy stone artifacts.

1-4, plummets; 5, grooved sinker; 6-7, choppers; 8, chipped celt; 9, chipped, pecked, and partly polished celt; 10, polished celt; 11, sinew stone; 12-13, pecked fragments; 14, hoe(?); 15, unfinished gouge or adze; 16, rubbing stone; 17, large flake used as hammerstone; 18, pestle; 19-20, hammerstones; 21, anvil stone.

1, 2, 10, 21, granite; 3-5, 12, 13, 16, 20, diabase; 15, porphyritic diabase; 7, slate; 6, slaty-sandstone; 18, schistose sandstone; 8, 14, sandstone; 9, 11, trap; 17, quartz; 19, quartzite.

PLATE XIX
Clark's Pond: Artifacts of bone.

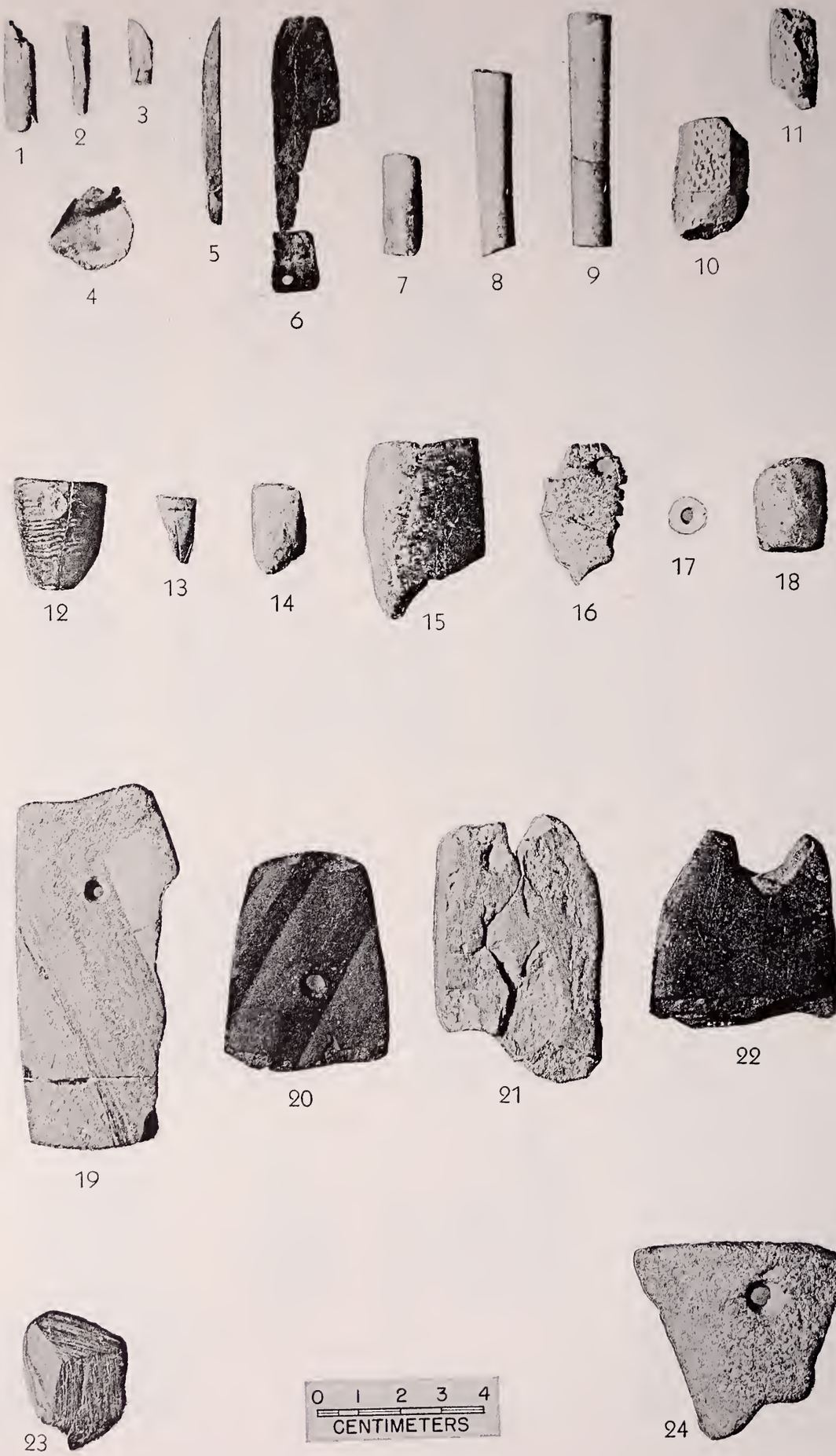

PLATE XX

Clark's Pond: Pipes, Ornaments, and Metal.

1-3, beads, native copper; 4, European copper; 5-6, European brass; 7-9, European clay pipe stems; 10-14, fragments Indian clay pipes; 15, fragment steatite pipe; 16, steatite pendant; 17, shell bead; 18, clay bead; 19-20, drilled slate pendants; 21-22, slate pendants or gorgets in process; 23, faceted graphite; 24, rim sherd, steatite vessel.

PUBLICATIONS OF THE
ROBERT S. PEABODY FOUNDATION FOR ARCHAEOLOGY
PHILLIPS ACADEMY, ANDOVER, MASS.

BULLETINS

I. Exploration of Jacobs Cavern, McDonald County, Missouri. By CHARLES PEABODY and W. K. MOOREHEAD. 1904. (out of print)

II. The So-Called "Gorgets." By CHARLES PEABODY and W. K. MOOREHEAD. 1906. (out of print)

III. A Narrative of Explorations in New Mexico, Arizona, Indiana, etc., Together with a Brief History of the Department. By WARREN K. MOOREHEAD. 1906. (out of print)

IV. Part 1. The Exploration of Bushey Cavern near Cavetown, Maryland. By CHARLES PEABODY. 1908. (out of print)
Part 2. Fort Ancient, the Great Prehistoric Earthwork of Warren County, Ohio. By WARREN K. MOOREHEAD. 1908. (out of print)

V. Certain Peculiar Earthworks near Andover, Massachusetts. By WARREN K. MOOREHEAD. 1912. (out of print)

VI. Hematite Implements of the United States, Together with Chemical Analyses of Various Hematites. By WARREN K. MOOREHEAD. 1912. (out of print)

PUBLICATIONS

I. The Archaeology of Maine. By WARREN K. MOOREHEAD. 1922. (out of print)

II. The Archaeology of the Arkansas River Valley. By WARREN K. MOOREHEAD, with supplementary papers on The Prehistoric Cultures of Oklahoma by JOSEPH B. THOBURN and The Exploration of Jacobs Cavern by CHARLES PEABODY. 1931. $4.00

III. Etowah Papers, 1932. $4.00.
1. Exploration of the Etowah Site in Georgia. By WARREN K. MOOREHEAD.
2. History and Symbolism of the Muskogheans. By C. C. WILLOUGHBY.
3. A Study of the Ceramic Art of the Etowans. By MARGARET ASHLEY.
4. Comparison between Etowan, Mexican and Maya Designs. By ZELIA NUTTALL.
5. Molluscan Shells of the Etowah Mounds. By FRANK COLLINS BAKER.

PAPERS OF THE SOUTHWEST EXPEDITION

I. An Introduction to Southwestern Archaeology. By Alfred V. Kidder. 1924. (out of print)

II. Pueblo Pottery Making. By Carl Guthe. 1925. (out of print)

III. The Pueblo of Jemez. By Elsie Clews Parsons. 1925. (out of print)

IV. The Indians of Pecos Pueblo, a Study of Their Skeletal Remains. By Earnest Albert Hooton, with appendices on the Dentition by Hable J. Rihan and on the Pelves by Edward Reynolds. 1930. $5.00.

V. The Pottery of Pecos. Volume I. 1931. Dull Paint Wares. By Alfred Vincent Kidder, together with a section on Black-on-white Wares by Charles Avery Amsden. (out of print)

VI. The Artifacts of Pecos. By Alfred Vincent Kidder. 1932. $4.00.

VII. The Pottery of Pecos. Volume II. The Glaze Wares. By Alfred Vincent Kidder and Anna O. Shephard. 1936. $5.00.

PAPERS OF THE ROBERT S. PEABODY FOUNDATION FOR ARCHAEOLOGY

Vol. I, No. 1. Two Sites on Martha's Vineyard. By Douglas S. Byers and Frederick Johnson. 1940. $1.00.

Vol. I, No. 2. Grassy Island: Archaeological and Botanical Investigations of an Indian Site on the Taunton River, Massachusetts. By Frederick Johnson and Hugh M. Raup. 1947. $1.00.

Vol. I, No. 3. Excavations in Northeastern Massachusetts. By Ripley P. Bullen, 1949. $2.00.

Vol. II. The Boylston Street Fishweir. By Frederick Johnson and others. 1942. $2.00.

Vol. III. Man in Northeastern North America. Edited by Frederick Johnson. 1946. $2.00.

Vol. IV, No. 1. The Boylston Street Fishweir, II. A Study of the Geology, Palaeobotany, and Biology of a Site on Stuart Street, in the Back Bay District of Boston, Massachusetts. By E. S. Barghoorn, P. S. Conger, S. Judson, F. B. Phleger, and L. R. Wilson, Edited by Frederick Johnson. 1949. $2.00.